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GAS-WATER-HEATING AN AVENUE TO INCREASED BUSINESS.

Twenty-five years ago and less an ample supply of hot water in the home was considered a luxury. Today it is recognized as a necessity. Many homes constructed during those decades, equipped with stove and furnace-heating apparatus, are still lacking an equipment that will give them an instantaneous supply of hot water at a low initial cost. Villages are growing into towns and towns are assuming the proportions of cities, and throughout their residential portions such houses are to be found. In addition to those cases, we must recognize the improved status of the farmer, living near towns and cities, whose increasing affluence enables him to demand and obtain all the conveniences of city life. The farmer's children are educated in the city and, at each return home, draw comparisons between the comforts of the city and the farm house, and the parents are being educated in this way and are imbued with the desire to install the best appliances for domestic convenience and comfort, usually to the material advantage of the ever-vigilant mail-order house.

The best and most complete heating plants, using wood or coal as fuel, can only demonstrate their efficiency in proportion to the knowledge, vigilance and attention of those operating them. The discomforts attending the inclemencies of winter are sufficient to induce the user of these heating plants to acquire the knowledge that they lack, to exercise the necessary vigilance and to give the proper amount of attention. In spring, summer and autumn, however, man endeavors to shirk janitor-duties as much as possible. Hot water was abundant during the winter; the other seasons bring periods of trial to the housewife when hot water is scarce or non-existent. The house is piped for gas and a gas-water-heater offers an immediate solution of the difficulty.

Of these, there are various types, the best known of which is the range-boiler heater. Complex conditions have brought into being and caused a demand for automatic instantaneous gas-water-heaters. Gas-water-heaters have been evolved to meet

with every expressed and realized need of the market.

Hundreds of plumbers in different districts throughout the United States make a specialty of gas-fitting and one would naturally imagine that the business of creating and supplying the demand for these heaters would be welcomed and undertaken by them as a legitimate source of additional revenue. This, however, is seldom the case, and because of this manufacturers of gas-water-heaters are undertaking the selling of these appliances direct to the consumers and the plumber is satisfied to take whatever plumbing comes his way as a result of their selling ability. **It is not the cheapest way of doing business for the manufacturers; it is not the most profitable method for the plumbers.**

At the time of the first introduction of gas-water-heaters into the heating market, many thousands of dollars were spent by the manufacturers in the endeavor to interest the plumbers of the country i their sale and installation. These attempts failed to produce all the results anticipated, and for this failure there were several reasons, all of which remain more or less operative at the present day in greater or less degree.

In the first place, the average plumber does not give sufficient attention to the art of salesmanship. He can sell what he is asked for. A 10-year-old boy can do the same. If he does not have the article in stock, the customer is allowed to leave without an offer to secure it or without a suggestion of a substitute article. Few lines of industrial endeavor show the same apathy as that of the plumbers in the conducting of their business. If plumbers are to keep on living and make money while they live, they must develop their selling ability in the immediate future.

This, however, was not the chief reason of the failure, though it was an important factor. **The prime difficulty experienced was in getting the heaters installed satisfactorily.** We are perfectly aware, of course, that the early types of heaters possessed certain defects that caused trouble for which the plumber was not responsible. This has been the case with all new mechanical appliances as soon as they were placed in use under varying conditions. Many plumbers, however, have wilfully disregarded the details of the instructions given by the manufacturers regarding the installation of their respective heaters.

If the manufacturers stated that a one-inch pipe was required for the connection, in many cases, the plumber installing the apparatus immediately assumed that the manufacturers were deficient in knowledge of pipe-proportions and placed in position a ¾-in. pipe instead. The job is installed; the heater does not work properly; the heater is immediately condemned and thrown out, or the manufacturer of the heater or his agent is severely hauled over the coals. In the latter case, the agent will call the plumber's attention to the wrong size of piping. With a conscious air of superiority the plumber informs the agent that "He has never installed a one-inch pipe on a job like that in his life." Not only that, but he has to be begged and cajoled to make the change even if he is assured that he will receive payment for doing it.

Do you wonder that such a plumber finds it hard to make his business pay and sees his only opportunity to do business at all is by cutting prices?

Such men evidently think that all new devices of this character have been placed on the market by chance. No thought is given to the possibility of the manufacturers having experimented for years to obtain the highest efficiency and economy of the heater before placing it on the market. If they ask for a one-inch pipe, surely the size must have been determined upon as a result of intelligent choice. This is proven, for in every case where the difficulty was due to the installation of a wrong pipe-size and other conditions were favorable, a change of pipe to right size resulted in the perfect operation of the heater. **The method and material of installation of the heater should be the prerogative of the manufacturer and not left to the whims and fancies of the installer.**

"Put no damper in vent; never reduce the size of vent." So orders the manufacturer. The plumber and the consumer both agree that a damper will prove to be a magic economizer. "Gives better control, you know." Control of what? Nobody knows, but a damper goes in anyhow. Perfect efficiency is not secured and the apparatus is condemned.

A prominent manufacturer of heaters of these types was asked to outline his opinions on this matter and we think his statements may be helpful to us all to obtain a better view of the possibilities of this business:

"In our experience, the most frequent troubles with gas-water-heaters can be eliminated by more careful installation.

"In fact, the reading of direction-cards accompanying heaters, which are gotten up with a knowledge of conditions to be met with and what must be done to insure satisfaction, will most invariably result in satisfaction and the elimination of troubles. Along that line, we would say further, that manufacturers, as a rule, have competent departments for advising the trade what to do when unusual conditions have to be met with.

"Regarding automatic-water-heaters.—The most frequent complaint experienced by most manufacturers of automatic-water-heaters is due to fitters using an excessive amount of pipe dope and putting it on the female threads instead of the male threads. Pipe dope should always be used on the male threads. Then it will do no damage and will help to make tight joints.

"A plumber should make sure that the water-pressure is sufficient to operate heater. Should the water-pressure be less than 8 lb. automatic-water-heaters should be spe-

cially equipped for light water-pressure. Mention should be made to the manufacturer when ordering, that heater is wanted for such light water-pressure. Mention should also be made in the order, when the heater is to be used with a water-supply furnished from an overhead tank, and the distance between the tank and the highest fixtures should be given. Then the manufacturer can tell if there is sufficient fall to operate the heater satisfactorily without further elevating the tank.

"The usual remarks can be made about carelessness of the trade in using adequately large pipes for gas. Instructions in the instruction-cards furnished should be carefully followed to insure heaters getting enough gas to enable them to operate up to capacity. The cost for using proper-sized pipe is in every instance but a few cents more than the cost of using a smaller size where proper results will be doubtful.

"Automatic-water-heaters should always be installed close to a chimney having a good draft and as close as possible to the nearest hot-water risers.

"It is important that manufacturers' instructions regarding the size of gas-meters be followed, for no matter how nicely a job be installed otherwise, if the gas-meter is too small, the job will not work right. If a gas-meter is larger than required, no harm will be done, for a heater will burn only so much gas anyway.

"Regarding instantaneous bath-water-heaters.—The same remarks about piping, etc., apply to these as to automatic water-heaters. Different conditions prevail in venting instantaneous bath-water-heaters than in automatic water-heaters. The vent-pipe from automatic water-heaters is almost always connected to a chimney, which disposes of it satisfactorily. Instantaneous water-heaters, being installed on higher floors of the house, are not always convenient to a chimney, so vent-pipe from instantaneous water-heaters, when not connected to a chimney, ends in an attic or out of doors.

"Terminating it in an attic is a very satisfactory method. There is one precaution to be observed when that is done and that is to see, if the end comes closer than two feet to any wood-work, that an elbow be used on the end of it to deflect the heat out into the open and away from the wood-work.

"When it ends out of doors, it should be carried up above the high point of the roof, just as is done with a chimney and even then it is a good idea to use a vent-hood or cap on the end of it to prevent any possibility of trouble from down-draft."

It would require more space than we have allotted to us to describe in detail the many absurd non-compliances with the instructions of the manufacturers and with the dictates of sense, common and preferred. The water is tested for temperature without a definite period of flow so as to obtain a correct reading. All kinds of tees and twists are given to the piping for no apparent reason whatever. The appearance of water of condensation is immediately seized upon as a case of coil-pipe leakage.

To sum up the situation in concrete form, the average plumber has not seen fit to give time to study the essentials of gas-water-heater installation. He has expected that it possessed sufficient elasticity of construction to accommodate itself automatically to all the loads imposed upon it by differences of water, ignorance of operators or neglect in installation. By so doing, he is losing opportunity of gaining ground in his business territory. One bad installation, probably due to his own neglect of instructions, has given him cold feet.

He should remember that his trade and its conditions are changing and he must adapt himself to those changes, even at the cost of having to think and study awhile. Nothing worth while has been attained without effort and repeated striving brings success in war, law, love and business.

A definite and profitable business in gas-water-heaters can be created, maintained and increased by an intelligent coöperation of the plumber with the manufacturers of the different types of heaters. The details of their installation offer no untoward difficulties. Their construction is extremely simple. The manufacturers will make it their business to advise the installer concerning the character of installation required where the local waters possess unusual impurities. A window-display of a heater in operation from time to time will help to arouse interest and a consistent following-up of the leads that develop and use of normal selling ability will bring orders, prestige and profit. **The gas-water-heater is decidedly a plumber's opportunity.**

THE PLUMBER AND THE PRESS.

Is the Plumber's or the Doctor's Bill Preferable?

One of the first questions which confront the modern home-builder is, whether he prefers to pay the doctor's or the plumber's bill, says "The Trenton (N. J.) Sunday Advertiser." If the plumber does his work conscientiously and well, it will act as a preventive against disease; if he does it carelessly, or inefficiently, the services of the physician will certainly be required in the home. The plumber prevents the contraction of many diseases, which, when contracted, the doctor must be called in to cure. Whether, in the end, the bills of the physician will not be larger than those of the plumber is a mere question of the nature of the disease which afflicts the family and the length of service which it requires from the healer. So that economy becomes a factor in the problem of the doctor and the plumber, and economy is one of the most serious problems with which the home-builder has to grapple in the making of his plans.

Proper sanitation in these modern days is sought for in the construction of all new buildings, and it is upon the shoulders of the plumber that the responsibility for securing this chiefly rests. In olden times the plumbing fixtures of a house were hidden away in poorly lighted, poorly ventilated, out-of-the-way places. Now they occupy conspicuous places, are exposed, so far as possible, and are looked upon rather as luxuries than as mere necessities. The essentials of an effective system of plumbing are an adequate supply of water to flush the various fixtures, enameled iron or porcelain fixtures in well-lighted and well-ventilated rooms, waste-pipes large enough to carry off all waste material, but not too large to be self-cleaning, a system of ventilation so arranged that it will ventilate every portion of the drainage system properly, a quality of piping for soil-pipes and drains that will not corrode or be affected by sudden changes in temperature and a thorough system of testing and inspection by practical men not only when the work is finished but during the installment of all the piping.

The plumber is the man who can save the doctor's bills and keep away many diseases from the home through his skill and knowledge of what good plumbing really means.

TRADE PROTECTION.*

By J. W. Drury, Detroit, Mich.

As intelligent organization and intelligent co-operation are the keynotes of success in all association work, and especially the work of those associations having for their object the bettering of trade conditions and the protection of trade, so must intelligent co-operation be the means of extending the organization, and its influence.

The association of master plumbers depends upon its members for that co-operation which alone will make it more and more a powerful influence in the work it has undertaken—a work which meets with the approval of practically every master plumber in the country, many of whom would not remain outside of the association if they once thoroughly understood the advantages of membership. We wish it were possible to have an organizer in every locality, but even were that possible, he could not do the good for the association that would result from the intelligent co-operation of the individual members with the national and state officers.

Never before has trade protection in the various branches of industry received so much thought or been so well understood as at the present time, and never before has it been so popular. Particularly is this true in the field of the master plumber, and everywhere is a keener interest now taken in the work of the association than has heretofore been the case. But how much more effective would our work be if in every locality where we now have but a member, or two members, the one or two would interest themselves in bringing in others and in forming a local, which would prove of inestimable advantage to both the old and new members.

If we would assume each other honest, and get together in united effort to improve the situation, things would go along much better.

Many people are short in united effort. There are lots of business men who do not know what "united effort or co-operation" really means. They don't seem to realize that in helping the general cause they can help themselves.

They think it a waste of money to contribute to an association. They seem to believe that an association is a sort of poker proposition in which the jack-pot is to be raked in by some winner. If they put $50 or $100 into an association, they say farewell to the money and never expect to see it again. They pose as martyrs.

Now, that isn't the way of it at all. You contribute your cash to an association of united effort, which is to help move your freight, help fight your battles, and help you in a great many ways in which **you could not help yourself single-handed.** If you think your $100 goes into a jack-pot for some lucky fellow to rake in, just watch it, Mr. Plumber, and see what becomes of it.

The manufacturers and wholesalers are strong on associations. They pay a lot of money to keep their various organizations going. When you present your kick to a wholesaler, it must go to an association. Now, how is the retailer going to reach the wholesaler unless he does it by united effort.

The words "united effort" are very common, and mean a great deal, but do they really mean anything to you?

Have you any conception of what united effort is?

Have you any idea of the continuous united effort that an association puts forth?

It is individual effort multiplied many times over. Co-operation is the secret of our situation and success. The modern method is through association.

If there had been the right sort of co-operation, many of our past and present predicaments would have been foreseen and avoided.

The retailers had given the situation so little thought, and had come so far from anticipating any trouble, that up to the time when the gale made its appearance they thought everything lovely, and the goose hanging high and dry.

Now, when the fury of the gale has come, there is a scramble for ways and means to get from under. Why should this be? There is no excuse for it; only that we are not united.

The point aimed at is not a criticising one, but a boosting one. It is desired to impress on every plumber the advantage of getting together.

There are many things causing irritation, among the chief of which is that of one plumber trying to undermine another, auditing another's bills and thereby thinking to gain favor with the customer. One says, "I'll not do this," and another says, "I'll not do that."

Is this the way business men should do in these modern times?

Is this co-operation?

We think the business is going to Hades; we think we are down and out; and we blame the numerous small plumbers for it. The ship has sprung a leak, the signal of distress is being hoisted, the life-boats are swinging in their davits, and the gale is raging on, and what are we doing to save ourselves?

Man the pumps, float the ship, spread the sails, and with united effort and co-operation weather the gale and sail safely into port.

Retailers and wholesalers all have interests along the same lines. Loyalty should be your honored and cherished desire. It should be prized the same as your life.

We began by speaking of united effort, and we will close in the same manner, for we want to add that united effort and co-operation are needed, and must be maintained by the retailer just as much as by the wholesaler, or even more so.

Yet the retailer too often thinks that he doesn't need to bother his head over these problems and spend money for association and co-operation. In these days, the retailer without association or co-operation is like the small rivulet flowing from the mountain side through the bush and golden fields, until it meets with the "father of mighty waters," when its life and existence is swallowed up, and it is gone. So it is without united effort, co-operation and association.

You can obtain trade protection by following these rules:

Make a profit, not a pittance, on all you sell or install.

Be a live member of local, state and national plumbers' and steam-fitters' associations.

Subscribe for, read and learn from all the trade journals that represent your industry.

Make your business a present of all the good books pertaining to the trade.

In this way, you will grow with your business, and your business will prosper through you.

*Read at the annual convention of the Michigan State Association of Master Plumbers, held at Jackson, Mich., March 30 and 31, 1910.

Public Sanitary Station at Lawrence*

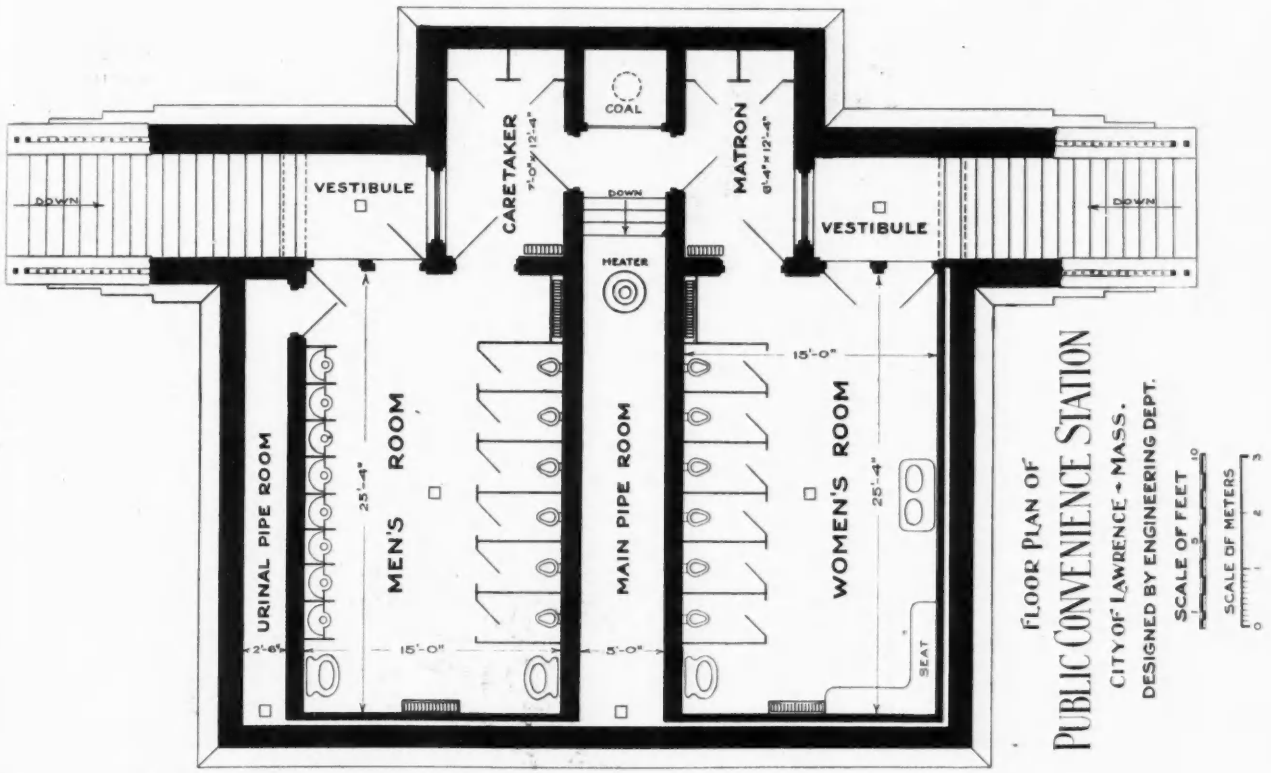
By Arthur D. Marble, Member of the Boston Society of Civil Engineers.

For a good many years the city of Lawrence had maintained a public urinal in the basement of the City Hall, directly under the office of the city treasurer. It was difficult to keep the place in decent condition, and there was more or less controversy as to what department of the city government was responsible for its care. The place naturally was especially offensive in summer when the windows of the offices above had to be open; and finally the city closed it up and purchased two sheet-iron urinals of the same pattern as the one that was located on Boston Common near the Boylston-Street entrance to the subway. The park department also had a urinal erected on the playstead; this was built of cast-iron sheets, and was supposed to be more or less ornamental, but the boys soon smashed it, and the remains had to be carted away to the dump. After the two sheet-iron urinals were purchased, the problem was where to put them. No one wanted such a structure near his place of business, so the city council finally disposed of them in the vicinity of two freight-yards near the heart of the business-section of the city, and they have probably served their purpose fairly well.

These urinals, however, only in a small degree satisfied the public demand. The women had not been considered in their installation, and they had to depend on the large stores, the railroad and the transfer-stations for toilet-conveniences. These places are usually so dirty and offensive that few women care to resort to them. Possibly Lawrence is an exception to the general rule, but I have heard otherwise.

For a long time agitation for a public-station for both sexes had been carried on in our city, and in 1907 its construction was made possible by a vote of the city council authorizing the park commission to spend $12,000 for what the order termed a "comfort-station," and the city engineer was directed to prepare plans for it.

Considerable opposition to its construction developed after the order appropriating the funds was passed, especially when the yearly expenses of running it was considered, which expense would amount to considerably more than half of the usual appropriation for the maintenance of our public parks. There are probably now many prominent citizens who, if they expressed their opinions, would be opposed to its continuance. One man, a would-be mayor, told me he would make a swimming pool of it if ever he had a chance; and another, an ex-mayor, said he would fill it in if he should happen to again occupy the mayor's chair. He had an idea that no decent woman would visit it. I told him that it was not used much by the so-called foreigners, but that nicely-dressed women, apparently of the English-speaking races, used the station largely, and it was with a good deal of pleasure that we could refute the charge that only foreigners would use it, and say that it was really a convenience-station to all classes of our citizens. The attendants tell me that the women's side is used by a better class than the men's. I mention these things to show that no matter how good



*Read before the Sanitary Section of the Boston Society of Civil Engineers, October 6, 1909.

a piece of work may be, how much it may be needed, or how economically it may be carried out, there is always adverse criticism if the public has to foot the bills, and I presume these conditions prevail not alone in Lawrence, but are common to most municipalities. The station in Lawrence was opened to the public on December 30, 1907,

Attractive Approach to Public-Comfort Station.

and within a week it was estimated that between five and six hundred persons used the station daily. On special days and Sundays the place is visited by four or five thousand on each side, and its necessity and value have been proven beyond the possibility of contradiction.

The attendants examine every closet after it has been used, and the station now is in as perfect condition as when first constructed. Not a dollar has been expended on repairs, and no plumber has been called in to remove any obstructions or remedy any defects.

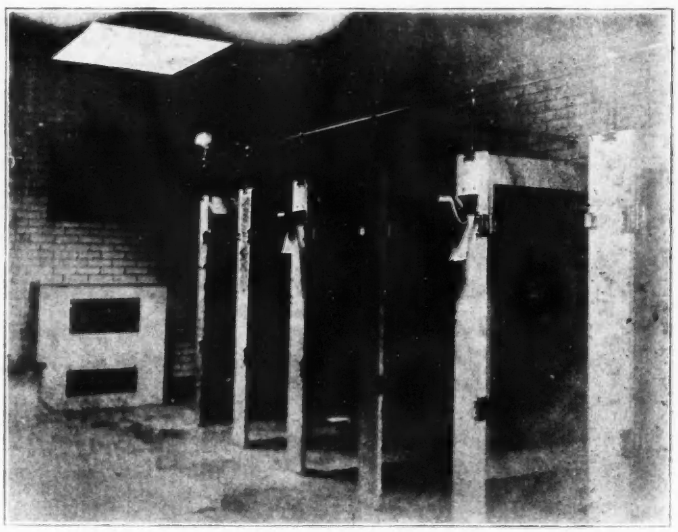
The interior of the building was made as white and as spotless as possible, so that no dirt could exist there without being plainly seen. The interior walls are of brick, and all exposed surfaces are built of white enameled brick, with a base of three courses of chocolate-colored enameled brick. The closet-bowls are set in the usual open plumbing style; the urinals are of solid porcelain, and run to the floor, so that the smallest boy can use them properly; the water-closet and urinal-partitions are of white Italian marble, said to be harder and less absorbent than any marble quarried in this country; the floors are of terrazzo, made of bits of stone embedded in cement, the prevailing color being white, with a neat mosaic border, all on a foundation of concrete; the ceiling is of concrete, painted white with one coat of "Bay State Brick and Cement Coating" followed by a coat of "Enamel" of the same brand. It would have been better to have put on two coats of the first, as the ceiling did not come out quite as white as was desired.

The main toilet-rooms are lighted by day by two skylights in each, 3 x 4 ft. in size, and at night by electric lights enclosed in holophane globes. The effect of the whole is bright, fresh and clean. The electric lights are divided into five circuits which are regulated from a switchboard in the main pipe-room. These circuits are men's-room and light at foot of stairs; women's room and light at foot of stairs; the transparency on men's side; the transparency on the women's side, and the attendants' room and pipe-room.

The station has also a "Gamewell Police-Signal Box," which serves as a call-box for the officer on that beat during the hours the station is open. This box connects only with the police station and, aside from that, the station has no telephone.

The general plan of the station includes the two main toilet-rooms, about 15 x 25 ft. in size with a 9-ft post. Each of these rooms contains 6 water-closets. In addition to the closets, the women's room has 3 lavatories and also a long seat built against the wall. The closet slips are 2 ft. 10 in. x 4 ft. 10 in. in size, from center to center of the marble partitions. The men's room has 2 lavatories and 8 urinals. The 2 radiators in each of the toilet rooms are enclosed in white marble, with white porcelain-enameled registers to allow the circulation of the air. A man would not be likely to try to spit through the registers and he certainly cannot spit behind the radiators.

In addition to the main toilet-rooms there are two attendants' rooms and two pipe-rooms. The main pipe-room, 5 ft. wide, with its floor grade 3 ft. below that of the toilet-rooms, runs through the center of the structure. This main pipe-room should have been at least a foot wider, for unless the plumber utilizes every inch of width, as he did not in our case, and carefully sets the heaters, there will hardly be room enough for a man to get by the large heater into the space beyond. In this main



One of the Main Toilet-Rooms.

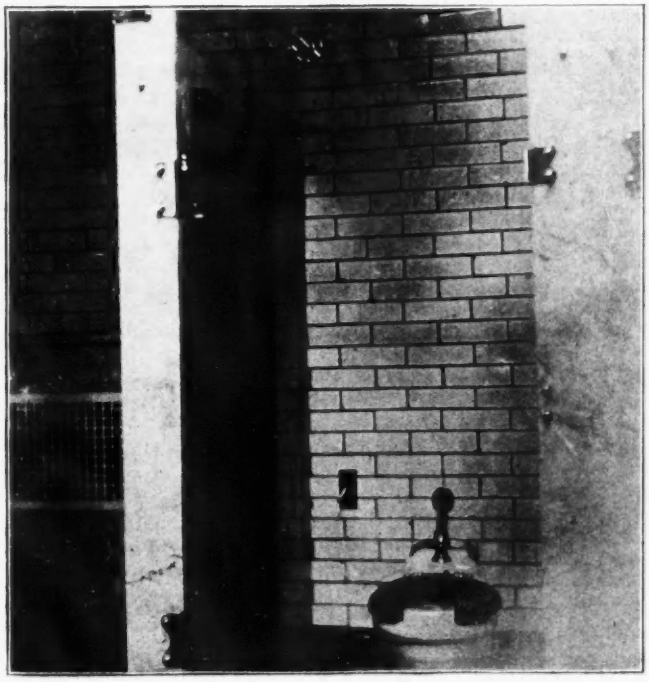
pipe-room are all the pipes, flush-tanks and vents connected with the water-closets, together with a Gurney heater, which in the winter heats the rooms and the water for the lavatories; also a small jacket-heater for heating water and maintaining ventilation in summer. The small heater is run continuously all summer and burns 2 tons of coal. A total of about 8 tons of coal is used in both

heaters for the year. Directly in front of the heaters (the door from the attendants' room opening between the two) is the coal bin, with a capacity of 6 tons. The bin is fed through a coalhole in the roof. On the side of the men's room back of the urinals is another pipe-room, with its floor 2 ft. below that of the toilet-room, in which are located the flush-tanks and piping for the line of urinals. There are 4 flush-tanks in this room, 1 for each 2 urinals, and they discharge automatically at intervals of about 2 minutes.

The ventilation of the station is secured entirely through the water-closet seat-vents, which are about 13 sq. in. in sectional area and pass through the wall back of the closets to the main galvanized iron vent-pipe, which is connected with a cylinder that surrounds the smokestack and reaches the open air near the top of the copper ventilator that stands on the roof of the station, and extends to a height of about 15 ft. above the ground.

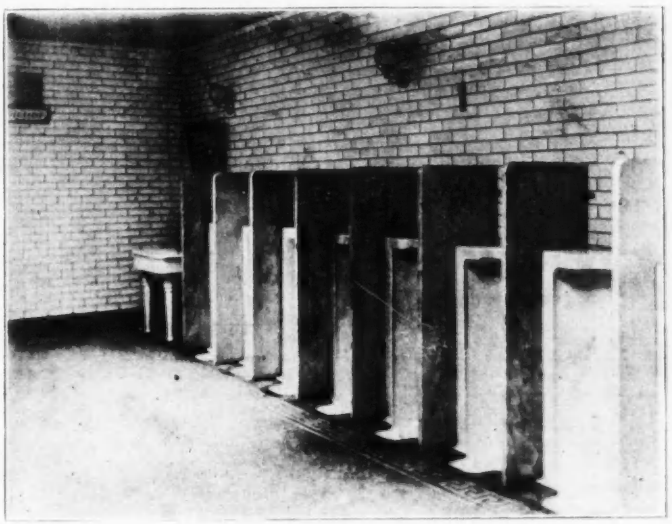
The seats of the closets are of wood, entirely cut away in front. We at first thought of having a porcelain seat, but they were said to be very unpleasant to sit on, so we adopted the kind described.

The attendants' rooms are 7 x 12 ft. in size, with a quartered-oak wardrobe filling the entire width at one end. These rooms are large enough for one or two chairs and also a couch, which we thought might be needed in case of any sudden illness. These rooms furnish a convenient



Showing a Closet in Detail.

place for the attendant to sit apart from the general toilet-room, and is so located as to command a view of nearly that entire room. There is a door leading into the pipe-room from both attendants' rooms, so that in case of a disturbance on the women's side the male attendant can be called in without his having to pass around on the outside. With the door locked on the women's side, the protection for that side is as perfect as though there was no door there. The attendants' rooms are ventilated each by a window hinged at the bottom, opening into the stairway landing. The men attendants, of course, do the heavy work, caring for the heating apparatus, taking out the ashes and shoveling snow in winter. They receive $14



A Satisfactory Urinal-Installation.

for a week of 7 days. The women receive $10.50 for a week of the same length. Both the male and female attendants keep the brass-work polished on their respective sides.

The structure was built underground so as not to disfigure the Common, and also to avoid the expense of exterior architectural ornamentation. Nothing appears above ground except the copper-covered ventilator and smokestack, which is rather ornamental, and the stone parapets with the wrought-iron fences which enclose the entrance stairways. Over each entrance is a wrought-iron arch carrying a transparency bearing on one the word "men," and on the other, "women." These transparencies show milk-white glass letters by day and are illuminated at night.

The outside walls of the structure are built of concrete, and the roof is a flat slab of reinforced concrete, both walls and roof being covered with Warren Brothers waterproofing material. As the walls are lined with brick inside, an air-space was left between the outer and inner walls, and this air-space would probably have kept the interior walls dry without any waterproofing. The excavation was somewhat wet as we neared the floor-grade, and two broken-stone-drains were laid across under each toilet-room floor, terminating in an open pipe laid through the wall into the main pipe-room. The main pipe-room is drained of ground or surface-water into the trap of the main drain. With these drains, and the bed of cinders under the concrete floors, no dampness ever shows on the terrazzo. To further protect the walls against dampness they were backed up with cinders.

The interior of the station can be washed out with a hose, if desired, and the floors are drained into a cesspool in the center of each toilet-room, and in the landing at

the foot of the stairs. The last-named cesspool also takes the rain-water which finds its way down the stairs.

In addition to the conveniences sure to be found in such a station, paper and liquid soap are furnished free of charge. The paper is delivered from two Springfield paper holders in each toilet-room. The paper used costs about $7 per month, and the soap about $25 per year. A roller-towel was at first hung up in each toilet room and nickel-plated roolers were attached to the walls for them to run on. Of course, they never should have been even thought of, but the Park Commission were impressed with the idea that the popular demand required them. However, they were soon discarded as unsanitary, and the material was cut up into individual towels, and given to the attendants, who take care of them and let them out for a cent each. The attendants have the proceeds. After this toweling is worn out it is intended to let the attendants furnish and care for the towels and have, as now, what they make out of them, the Park Commission regulating the price charged for their use.

One closet on the men's side is reserved as a pay-closet, but it does not amount to very much. In the first four months after the station was opened this closet was used but once. A charge of 5 cents is made for the use of this closet, and this charge includes a towel. The men's side of the station is open from 7:30 in the morning to 11:30 at night, and the women's from 8 to 11. Two men and two women are employed as caretakers, and the annual expense for maintenance is about $3,200.

Bids were received for building the convenience station ranging from $9,776 to $15,324; bids for plumbing, heating and marble work, from $2,997 to $3,933; and for electrical work, from $160 to $317.

The totals of the actual cost were as follows:

C. E. Trumbull Co., contract for general building work,	$9,776.00
Extras	234.38
Merrimack Supply Co., plumbing, etc., heating and marble work	2,997.00
Extras	71.73
Geo. D. Fitts, electrical work	160.00
Inspector	312.00
Water Department, piping	43.97
Blue prints	47.86
Police Signal-Box	150.00
Incidentals	104.89
	$13,897.83

THE PLUMBER AND THE LIGHTING TRADE.

Serious consideration should be given the prospective buyer when he or she comes into the plumber's place of business and commences to make inquiry about the lighting fixtures. It is very often the case that the plumber tells this prospective buyer: "Here's our line, what do you want?"

The method of interesting the customer in such a manner is very wrong and it is positive proof that nine times out of ten the plumber knows so little about the lighting game that he is merely carrying the lighting fixtures as a side line, in order to make up for a loss in his other branches of business.

When the plumber or the plumbing firm carries a line of lighting fixtures, no pains should be spared to have a good line and a tasty one. As soon as the line is installed in the store, the plumber or the person into whose charge that particular department of the business is given, should make a close study of it.

Once a good knowledge of the lighting "game" is acquired, the public soon learns of this and immediately trade starts to get a move on and the department is placed on a paying basis almost on the jump.

It is quite proper for the dealer to ask the customer if he or she is seeking a portable for the reading room, or a fixture, either dome or shower, for the living room or dining-room, whether or not the room is a high one or of low ceiling, whether or not the color of the paper is light or dark, and whether the home is furnished in dark or light wood.

These are important points. The customer becomes interested. The salesman is asking questions that many times the prospective buyer has given very little consideration. However, such queries brings out points that are helpful to the buyer in making the proper selection of a lighting fixture.

When the ceiling is a low one, the lights could be easily thrown "up" by the fixture, and if the room is high, then let the lights fall "down." Another point that should also be brought out is the color of the shades that are to be used on the fixture. For a high room the dealer should bring out the point that crystal effects in shades are quite proper, while for a low room, green or amber effects in the glass shades would be found to be preferable.

It has been agreed by many lighting engineers that greens and ambers are the best glass to be used for lighting purposes, when used in the home. The amber dome is a very handsome effect, and it throws a soft mellow light that is pleasing to the eye and gives the room an artistic taste. There are many domes for the gas portable and in as many colors, but when the green or amber color is used, no prettier effect could be obtained, with the possible exception of the iridescent shade. The latter shades used on the electric shower gives a beautiful effect.

There is no denying the fact that when the possible customer learns that the salesman is "showing him" he is all the more apt to become more interested, and at the same time is more liable to buy a more costly fixture.

All plumbers who have large displays of lighting goods should keep at least one portable for show purposes. That is to say, one portable should be so fixed that all shades could be shown, and one at a time.

The most successful method of selling portables is that where an ordinary parlor table is used (any covered table will answer, however) with the portable placed in the center. This or that shade could be placed on the already lighted portable and the true effect of the shade is at once made known to the customer.

The cost of showing your line of lighting fixtures in this manner is very slight, and the returns from such a method are many.

One of our subscribers, writing to us a letter of good cheer, said: "I receive much enlightenment each week from D. E." In other words, he is "D. E. lighted" each week by its appearance.

The extraction of oxygen from the air for special manufacturing purposes may lead some day to the formation of an air trust. Plumbers and steam-fitters may then have the work, under the permission of that beneficent organization, of installing complete air-piping systems and air-meters in every home. Better study up on air!

A PLUMBER'S DIARY

BY PHOENIX

The "Plumbers' Diary" is no pipe dream. It is not the product of mere imagination. It represents in diary form the actual experience of the journeyings up of a journeyman to full master plumberhood. Our practical readers will recognize the faithful touches of trade experience, many of which will call to their mind similar experiences of their own. From this stage on the growth of the upward climber is to be noted by his better use of the English language, the effective centralization of his ideas and the display of keener power of observation. Such growth is not achieved between two issues of a weekly journal, but represents months of effort. We are staging this for the benefit of our readers and take advantage of the privilege of stagecraft, which drops months and years from scene to scene and act to act. We will be pleased to receive from our readers descriptions of similar experiences that may occur to them as they keep track of the "Plumbers' Diary."

X.

August 3.—In the course of my writing to so many master plumbers I certainly ran up against a good many people who always had more or less of a "grouch" and some (be it told on the quiet) whose spelling, language and letter-writing were far from perfect. Indeed some of the letters would not have drawn a marking of 23 per cent in an examination for 12-year-old boys in the common schools.

Some of the parties who boasted the loudest about being "practical" men seemed to have the least education and tried to cover up their want of education and lack of the technical part of the game by sneering at anybody who was not as ignorant as they were themselves. I soon found out that to offer a letter of recommendation (to the average master) was to cast suspicion on myself at the very start. So I cut it out, and to look at the matter from at least one angle, perhaps they were right, for a man's work soon shows up what he is or is not, and the master who can not tumble to the fact pretty quick isn't much of a practical man.

When I really got into the game and later had a chance to see a few of the letters that various fitters had written (comparing their work meanwhile with what they claimed that they could do) I dropped this sentence from my letters of application: "Do you want to hire a first-class (or an A No. 1) fitter or plumber?" That's about the first thing a poor workman generally puts into his letter.

A master who does not respect education and much or little technical knowledge of either or both crafts deserves to have only bums and hobos working for him, and those are the classes that he gets mostly, for no self-respecting journeyman will hold down a job in such a shop any longer than he is obliged to from force of circumstances.

This first letter I got out contained so many mistakes in the way of judgment that I shall not give it, but will give one that is much better, though the first series certainly got me some results.

This might not be the kind of a letter that would make a hit with a bank president or a railroad magnate nor is it to be so construed. I am now writing for the plumbers and they require a somewhat different line of treatment, just at present, anyway.

What concerns the master most in taking in a new man is whether or not he can place any dependence upon the workman. No matter how well the man may do his work when he is on the job and in shape to labor, the main question is, "Will he get to the job and stick it through?"

I found that there were at least two ways of showing this quality in a letter to a stranger, and it was as follows: First, you can say "I worked three years at my last place." Second, and this goes fairly well, "I am willing to come on trial and let the work show up for itself."

Now, either of these points will hit the master much better than merely saying that one is a first-class man or "I don't drink." He will regard the last statement with much suspicion, be it said, for the average plumber does drink and always has, some, though, to a limited extent.

Hard-luck stories, confidences, knocking either the closed or open shop doesn't go at all. Fifty words are better than five hundred, and for the benefit of some one who has not tried these matters out I am going to give a couple of forms which say much in little when one comes to think them over. I do not say but that they might be improved, but I am stating that they are the result of lots of experience and that they mostly accomplished the purpose for which they were sent, and that was to either land the job or at least get the master interested. One should get the spelling right. The capitals can be shoved into place and the commas and periods scattered in with due care. Perhaps the party who reads the letter isn't up on punctuation anyway or may be is too busy to notice. In these days of typewriting punctuation seems to be all in a class by itself, anyhow. Here come the two letters, as follows:

"Pinetown, Pa., May 4, '92.

"Smith & Co., Roby, Iowa.

"Do you need a plumber? Will come on trial and let the work show for itself. Am married, ten years a journeyman. No work in sight around here. What are your wages and hours? Waiting reply, I am,

"Yours truly, John Brown."

Here is another sample letter which contains even fewer words than the first effort:

"Growville, Ohio, June 7, 1901.

"Snow Plumbing Co., Farnum, Kan.

"Gentlemen: Can you use another experienced steamfitter? Am married, was two years with last employer, and can take charge if desired.

"Yours truly, John Smith."

At first I used to throw away quite a little postage by enclosing stamps, but I afterward came to the conclusion that if a man had work and did not care to reply for the want of a few cents why I would not care to work for such a man. If the master is hard pressed for help he will answer all right and perhaps telegraph for one to come, on general results.

Now, I stated at the beginning of these Diary notes

that the points came by hard knocks. Perhaps some bright light might have sat down and knocked out even better letters than the foregoing at the first shot, but it had to come to "yours truly" mainly by bumps and a good many of them at that. People in our business and craft have always been very shy in telling what they knew (perhaps because it was so little) and so I am not ashamed to set down such things because I know that there are some who will come after and perhaps they may not know it all while they are passing along the way. I turned ahead in my account, several years, but thought it better in order to get at the letter business the more completely.

WHAT THE LAW DECIDES.

Landlord Voluntarily Having Plumbing Repaired Is Liable for Negligence Only

By terms of a contract of letting, the landlord neither retained control over the system of drainage, nor agreed to make repairs for the tenant's use, if it became defective during tenancy. The supreme judicial court of Massachusetts says, in Stewart vs. Cushing, 90 Northeastern Reporter, 545, an action brought by the tenant against the landlord, that if the landlord had assumed, but neglected to perform, this duty after notice that repairs had become necessary, the plaintiff's remedy would have been an action for breach of contract.

It appeared in evidence that after complaints by the plaintiff (tenant) that the sink had become obstructed, and a noxious odor was noticed in the basement, the defendant (landlord) caused the pipe to be examined, and the obstruction removed, but, the odor continuing, he again sent plumbers to ascertain the cause. But as these repairs or examinations were voluntarily and gratuitously made, no liability was imposed upon him, unless the work was negligently performed. If subsequently, as the result of an investigation by the board of health, to whom the plaintiff complained, it was ascertained, upon a removal of the floors in the basement, that the odor causing her sickness emanated from a break in the elbow of the drain-pipe, the uncontradicted evidence negatived any connection whatever between the defect and the acts of the defendant's workmen. The evidence offered, that in removing foreign substances a usual method was to break holes in pipes, which were afterwards patched, was inadmissible. To prove what other plumbers might have done, did not furnish proof that the defendant's plumbers had disturbed or broken the elbow.

The plaintiff having failed to offer any evidence of the defendant's (landlord's) negligence, her exceptions to a judgment in his favor must be overruled.

Title to Heating Plant Lost.

In an action by a company against a school district the supreme court of Arkansas says that the company entered into a contract with one Park for the construction of a schoolhouse in the district. The plans and specifications, which were a part of the contract, provided for the installment of a heating plant. Park made a contract with the plaintiff company to furnish the material and install the heating apparatus. The contract provided that the title to the material furnished should remain in the vendor (company) until paid for. The heating plant, with the necessary warm-air furnaces, pipes, flues, registers, facings, etc., was duly erected in the schoolhouse. Park failed to complete the building, and turned it, with the heating plant which had been installed, over to the board of directors, who had the buiding finished.

The school district paid out more than the contract price to erect the building. The directors knew nothing of the terms of the contract price to erect the building. The directors knew nothing of the terms of the contract between Park and the plaintiff company. They did not know that the contract for the heating apparatus provided that the title to the property should remain in the vendor until paid for. Park failed to pay for the heating apparatus, and the company instituted this action in replevin to recover it. The company adduced evidence tending to show that the machinery which composed the heating plant could be removed without injury to the school building. On the other hand, the school-district adduced evidence tending to show that it was a part of the building, and could not be detached without defacing and otherwise injuring the building. The trial court dismissed the complaint against the school district, and the supreme court thinks that the judgment was right, Peck-Hammond Co. vs. Walnut Ridge District, 123 Southwestern Reporter, 771.

The cases cited for the company were cases where the contract reserving title in the chattels was made with the owner of the land, and had no application to the facts of this case. The heating plant was installed under a contract with Park in a building on land belonging to the school district. The plaintiff company knew that the building was not being erected for occupancy by Park, but that it was built for use as a schoolhouse, and that the installation of a heating plant was a necessary adjunct to the building. The board of directors were not parties to the contract between the company and Park, and had no knowledge of the conditions thereof. Under such a state of facts, there was a necessary inference that the heating plant was affixed permanently to the structure, and a conclusive presumption that it should become a part of the realty.

A SUGGESTION REGARDING LOCKS AND KEYS.

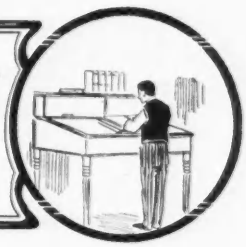
A master plumber must of necessity have a number of tool-boxes and lockers which he keeps locked, and ordinarily he has a key for each one, the result being a mighty big bunch of keys. In my business I found it advantageous to purchase twelve Yale locks, with two keys for each and four master-keys. Each fitter and foreman was given a key to his own box and a record made of the same and in addition each of the proprietors were given keys and one was kept in the safe in the office, and we now find that it is very convenient to pull out one key only and be enabled to open any of our tool-boxes, lockers or barn and store-yard. The cost is trifling when the convenience is considered. Squire Hotfoot.

WILL GIVE A COMPLETE CLOSET-COMBINATION FOR A NAME.

Now is the time for the sprouting of ideas. The "Ideal" Carriage Washer & Automatic Water Saver Co., 561 E. Main St., Rochester, N. Y., is placing an automatic water-closet on the market and wants a name to distinguish it by. There is already an "Ideal" closet known to the trade. The company offers a complete closet-combination in return to the successful baptizer of its product. Intending competitors can obtain the booklet on this closet upon application to the Rochester office. We wish we were a plumber. We would suggest "Autowatoclo," or "Setzen sie sich." Go to it, brainy ones, with a fair field and no favor!

BUSINESS MANAGEMENT

NEW METHODS FOR OLD



WHO PAYS FOR THE ESTIMATE?

Editor "Domestic Engineering":—In regard to N. R.'s query, "Who Pays for the Estimate?" in your issue of today, I will give my way of getting at such items.

I know just how much of a percentage it costs me to do business, figured from the preceding year's business, and this percentage covers just such incidentals. I don't receive the money outright as the doctor or lawyer does, but when it comes to a settlement after finishing a contract the money is there even if it is not itemized.

Of course, I don't get every job I figure, but at the end of the year I find that I have always been paid for time put in on estimating.

Some of your readers might make objections to this method, but I think that the time spent in estimating is just as much of an expense to me as my drayage, freight or rent, and should be figured as such.

In regard to your article on letter-heads, I think that there are several plumbers and other business men as well who need a little education in this line. I don't think mine is a world-beater, but I do think it is neat and contains enough printing matter to explain my business.

L.

[Editor.—L.'s letterhead is neat, well-printed and on good stock. It could advantageously be given a more liberal display, with the printed matter of greater depth.]

A FIRST-CLASS OFFICE-MAN IN THE RETAIL PLUMBING BUSINESS—WHAT IS HE WORTH?

Editor "Domestic Engineering": There have from time to time appeared in your paper many questions and answers about different things relating to the plumbing business, but never has anyone asked the above question. When I say **first-class** office-man, I mean a man that can do anything that may be required of him and do it in a first-class manner; a man that is dependable and not only a bright or shrewd man. There are many bright or shrewd men but not dependable. They are not sound and haven't got level heads. In all lines of trade or profession, or I might say for every occupation, there seems to be a fixed standard of compensation. As for instance in the town where the writer lives, laborers, that is for digging work, get $2.25 per day as a rule, and some of them even get $2.50 per day. Foremen laborers get $2.75 to $3.00 a day. Teamsters in different lines get from $12.00 to $15.00 a week. Union plumbers get $4.50 a day and the shops that run open, pay somewhere near the union scale for good men and sometimes even a little more than the union scale. Now, right off the bat, someone might say, "Hire a first-class man at whatever you can get him for." Such an answer might be all right; but, suppose you were to hire this man, what would you offer?

Now, my ideas of the duties of a first-class office-man is as follows: The reason that I am going to mention so many requirements is because in many places where there are only 25 to 50 men employed, there is only one "office man" outside of the proprietor. He must be a good man to keep the store or office always looking in "Sunday attire." Must be a first-class bookkeeper so that he can tell in a minute or two just what is what. Must be a good buyer and stock keeper. Must be a good collector. Must be able to know if a job is done right or not. Must be able to figure work and close contracts at a good profit. In fact, he must know all about the business and of course it is taken for granted that he must be honest or you would not hire him even if he filled all the other requirements. I might also say that this man to be a success, must be of pleasing personality and one that can be depended upon, relied upon under all circumstances, to do the right thing the sensible way. Now let us hear from some of the broad-minded "bosses" as to what they think such a man ought to be paid. Should it be from $75 to $100 a month or $100 to $150 or $150 to $200 a month or should it be even more? Of course the location where this man would be employed would make some difference in his wage, as living expenses vary in different localities. Yours very truly,

"Minnesota."

REPLY TO THE HOLD OF THE GAS CO.

Editor "Domestic Engineering":—In your August 6th number, on page 152, we notice article "Hold of the Gas Co." We desire to make a few remarks on this.

Gas companies generally handle gas-water-heaters simply because the plumbers won't do it. Plumbers frequently are asked for a gas-water-heater, and instead will try to sell a coal-water-heater. When plumbers are asked to buy gas-water-heaters, they almost invariably answer, "We will order one when we have a call." They lose sight of the fact that everybody uses hot water and that waiting for calls is poor business.

How long would Marshall Field & Co., last, or Sears, Roebuck & Co., or any of those big concerns, if they stopped advertising and telling people what they had to offer, and asking people to buy? They wouldn't last any longer or make any more money than the plumber who follows those tactics.

Gas companies have gas to sell; as a result they have to strive to have in use the greatest number of appliances that will consume gas. It has been our experience that in towns where plumbers will try to sell gas-appliances, gas companies will not only leave the sale of appliances to the plumbers, or at least the sale of gas-heaters, but will moreover display the heaters that plumbers sell, and commit the purchase of heaters through the plumbers, and in many cases help the plumbers advertise them.

In cities where the plumbers will on a whole, sell more gas heaters than the gas-companies, and gas-companies generally appreciate that fact, and where they are selling water-heaters at cost now so as to get a volume of them in use, we feel very certain that they will be glad to discontinue that policy and leave matters to the plumbers,

and not wait for calls, but actually show enterprise enough to ask people to buy.

Plumbers, if they but knew it, or rather would but realize it, have lots of influence with their customers. When a plumber has a call to repair a leaky pipe, or broken faucet, he should take opportunity to look through the building and see if there is a good water-heating system in the building, and if not, to recommend some good system, which would be quite sure to result in an order immediately, or in the near future.

Where gas-companies will not give up the sale of water-heaters as shown here, because of being skeptical of the ability of plumbers to sell enough of them, owing to their knowledge of lack of enterprise of plumbers in the past, such companies will generally be found willing to raise their price for gas-water-heaters installed ready for use, to a substantially high figure to enable the plumbers to compete at a profit, and usually when shown that the plumbers mean business, such companies as referred to will be glad in time to entirely discontinue the sale of gas-water-heaters. Yours truly,

One Who Knows.

HOW LONG WILL IT TAKE TO SET UP A BOILER?

Editor "Domestic Engineering":—As I see by reading your paper that you say, "Fire the questions in" I will ask one, on which I would like to get the experience of others in the craft, and that is, how long do you estimate that it should take to set up an average boiler? Not having been in the business very long I should like a little information from others.

Des Moines, Ia. "2 and 6."

We should imagine that it would depend upon the make and size of the boiler, the convenience of the place where the boiler was to be set, the experience of the men who had the work to do, also their ability to use their head and save themselves any unnecessary labor. Anywhere from one hour to one day (possibly more) we should think. Perhaps some one will write and shed some light.

ON STOPPING NUISANCE-CREATORS OR MAKING THEM HARMLESS.

Editor "Domestic Engineering": In the issue of July 23 of your journal I noticed a plaint by "S. K." of New York, in which he stated that he is annoyed constantly by having match sticks, cigar butts and waste paper clog up his urinals and water-closets in the toilet rooms of which he has charge. Your comment thereon is right from a moral suasion standpoint, but I have found that fixtures in toilet rooms must be more or less "fool-proof," and the District of Columbia in its public-convenience stations has achieved a degree of success that is noteworthy.

We have had two such stations open for nearly four years and they have been used by millions of people of all classes who have not hesitated to deposit large wads of newspapers, banana peels, soiled clothing, tobacco bags, whiskey bottles, medicine boxes, razors and other similar articles in the closets, to say nothing of the cigar butts, matches, etc., mentioned by "S. K.," and in the four years stated there have been exactly three stoppages in the 50-odd closets and no stoppages at all in the urinals. This is wholly on account of the type of closet and urinal used.

I also have before me a record at the Stevens school where there are approximately 35 water-closets of this same type which were used to replace other fixtures about five years ago. Prior to the installation of the new closets for the three years that the record runs there was an average of more than one stoppage per week. Since the installation of the new closet there have been absolutely no stoppages.

The closets used are of the pressure-tank variety, siphon-jet bowls, with an opening throughout of the same size as the inlet, so that anything that will go into the trap will go through with all the pressure of the water supply behind it.

The urinal we use for all work of this class is of the overflow trough flush type of slate. This urinal has been used with great satisfaction here for a number of years. This type of urinal can be made in marble or in glass and makes a very beautiful fixture and is certainly more cleanly and sanitary than any of the various bowl types on the market.

I trust that these few lines may be of some assistance to our friend, "S. K.," and I will be glad to give him further information by mail.

Very truly yours,

A. R. McGonegal,

Washington, D. C. Inspector of Plumbing.

LIKES "DOMESTIC ENGINEERING."

Editor "Domestic Engineering":—I take great pleasure in sending you at this time a few words relative to the questions in the current issue of your valued paper. Your paper is improving with every issue and we are glad to note the new things you are providing for us.

There is more good in a good trade-paper than most people think. While I am a great reader and subscribe to Collier's, Leslie's, The Saturday Evening Post and all the monthlies from Everybody's to Outing, I can truthfully say that when "Domestic Engineering" and one or more of the others arrive at the same time that I read D. E. first always, then the others, and finally return to the D. E. to see if there is anything that I missed in the first reading.

Your views of shops in various parts of the country are particularly good and are an education within themselves. I like to see them, and will at some future time send you a picture of my own shop that you may see how we are equipped. At the present time we are a long way from having a pretty shop, although we have plenty of room, a good arrangement, ample facilities for handling our material, and last but not least we are fortunate in having our show-room, office, warehouse, work-shop, store-yard, barn, garage, wagon-sheds and residence all on one lot, having a street and alley frontage of 320 ft. My model shop is a dream as yet, but it will be a reality at some time, and when that time does arrive you may rest assured that you will at least receive a picture of it.

The advertisements are good reading for the progressive man and if a man follows them up carefully he will gain many things which cannot be found in any other way. Thanking you for harkening to my clamoring I remain, Yours very truly,

Minneapolis. Squire Hotfoot.

The circulation and influence of "Domestic Engineering" are increasing with each issue. You hear "the boys" talk each issue in our "Questions and Answers" and "Business Management" departments. Join in these lobby discussions. To help others is to help yourself.

A PRACTICAL MANUAL OF STEAM & HOT-WATER HEATING

BY EDWARD RICHMOND PIERCE

SECTION XVI.

All of these jobs would work nicely and probably give satisfaction, but the man who knew the most or paid the most attention to detail of his office-work had the low bid. The total weight of steam delivered to the radiators would not materially differ in either case, but the amount of extra steam required for overcoming friction would, in a large job, show in the fuel account.

From the foregoing it will, I think, be perfectly clear how different engineers may differ very materially in pipe sizes for a given job. They are simply working out different theories and different pressures.

There is one thing not to be overlooked. These very small pipes calling for high velocities are not productive of much value to the house-owner in mild weather from the vapor of steam. It has vitality or strength enough to work its way very slowly through the larger pipes, but the small pipe is very difficult for it.

Now that house-heating boilers are rated at 2-lb. pressure at boiler, it should be explained how to figure out the sizes that should answer for certain velocities. In attempting to explain this without algebra, I shall limit the explanation to jobs based on 2-lb. pressure at boiler and the use of average quality of cast-iron radiators rated for 4 or 5 sq. ft. per section.

We have seen that the average radiator above described at a pressure of 2-lb. at boiler gives out on an average 220 B. t. u. per sq. ft. per hr. when it is zero outside and the room is at 70 deg. (Table FF). It has been shown that the total B. t. u. which a job must be supplied with, through the pipes, will equal the total square feet of radiation multiplied by 220 B. t. u. given off by one square foot equal total B. t. u.

To supply this total amount of heat in B. t. u. a certain number of pounds of steam must be supplied each hour. To deliver this required number of pounds of steam through a pipe of one size will certainly require a certain velocity per second; through a larger pipe, another velocity, and so on. Therefore, the velocity of the steam must depend upon the area of the pipe to quite an extent.

TABLE W.

Table of the properties of steam from 29.7 in. of vacuum to 30 lb. gage-pressure.

Vacuum Inches of Mercury	Absolute Pressure lb. Per Sq. In.	Temperature Fahrenheit.	Total Heat Above 32		Latent Heat in Heat Units, Steam.	Volume Cu. Ft. in 1-Lb. Steam.	Weight of 1 Cu. Ft., Steam.
			in Water.	in Steam.			
29.74	.089	32	0	1091.7	1091.7	3333.3	.00030
29.19	.359	70	70	1103.3	1065.3	875.61	.00115
28.90	.502	80	48.	1106.3	1058.3	635.80	.00158
28.00	.943	100	68	1112.4	1044.4	349.7	.00286
27.88	1	102	70.	1113.1	1043.0	334.23	.00299
25.85	2.	126	94.4	1120.5	1026.0	173.23	.00577
23.83	3.	141.6	110.	1125.	1015.3	118.	.00848
21.78	4.	153.	122.	1129.	1007.	90.	.01112
17.70	6.	170.	139.	1134.	995.	61.	.01631
13.63	8.	183.	152.	1138.	986.	47.	.02140
9.56	10	193.	162.	1141.	979.	38	.02641
5.49	12.	202.	171.	1144.	973.	32.	.03136
1.41	14.	210.	179.	1146.	967.	28.	.03625
Atmospheric Pressure.	14.7	212	180.9	1146.6	965.7	26.36	.03794
Gage-Pressure in Lb.							
1 "	15.7	215.	184	1148.	963.	24.	.04110
2 "	16.7	219.	188	1148.	961.	23.	.04325
3 "	17.7	222.	191	1150.	958.	22.	.04592
4 "	18.7	224.	193	1150.5	956.	21.	.04831
5 "	19.7	227.	196	1151.	955.	20.	.05070
6 "	20.7	230.	199	1152.	953.	19.	.05237
8 "	22.7	235.	204	1153.	949.	17.5	.05711
10 "	24.7	239.	208.5	1155.	946.	17.	.06183
12 "	26.7	244.	213.	1156.	943.	15.	.06651
15 "	29.7	249.6	219.	1158.	939.2	13.61	.07350
20 "	34.7	258.7	228.	1160.8	932.5	11.76	.08507
25 "	39.7	266.7	236.5	1163.3	926.8	10.35	.09653
30 "	44.7	273.9	243.9	1165.5	921.6	9.27	.1079

In making comparisons with various tables of the properties of steam as given by different writers it will soon be noticed that there is some considerable difference, especially in the figures for weight and volume, this is caused by the fact that that portion of the table is derived from experiment with some and from formulae in other cases.

The tables most in use in this country are those of Porter, Clarke, Buel, Derry and Peabody. There is no considerable difference between these authorities in the important items of temperature, total heat, latent heat as given in their various tabulations. Therefore, so far as house heating estimates are concerned, almost any table of steam properties can be used with safety. In the foregoing table the gage-pressure is followed by the absolute pressure so that the difference can be seen at a glance. This is because in some sections of the country architects generally call for absolute pressure instead of gage-pressure.

In this, as in most heating problems, the question must be brought to some definite standard from which to work. In this pipe question the standard is 100 ft. in length of straight pipe.

In order to get this before us clearly, suppose we find out how small a pipe can be used to supply 760 sq. ft. of 3 col. cast-iron radiation with steam at 25 ft. velocity per sec., 2-lb. pressure at boiler.

At this pressure each square foot of radiating surface will emit 220 B. t. u. per hr, $760 \times 220 = 167{,}200$ B. t. u. per hr. From Table VV, on "Properties of Steam" we note one pound of steam gives up 966 B. t. u. in process of condensation.

We must furnish 167,200 B. t. u. per hr. One-pound steam furnishes 966; then $167{,}200 \div 966$ shows that we must deliver 173 lb. steam per hr. From the same table we learn that one pound of steam at that temperature makes 26.4 cu. ft. Therefore 173 lb., multiplied by $26.4 = 4{,}567$ cu. ft. per hr. to be delivered. There are 3,600 sec. per hr; then $4{,}567 \div 3{,}600 = 1.27$ cu. ft. per sec. We desire a velocity of 25 ft. per sec., therefore we divide 1.27 by 25 to find the area in square feet. Thus $1.27 \div 25 = 0.05$ of a square foot needed in the pipe, 144 sq. in. $\times 0.05 = 7.2$ sq. in. in area. The Table of "Area of Circles," Table A shows that a 3-in. pipe with an area of 7.068 could be used, although if it was a question of close fit for steady water-line, a 3½ in. pipe would be required.

Supposing 50 ft. velocity to be required. Then $1.27 \div 50 = 0.0254$ sq. ft. 144 sq. in. $\times 0.0254 = 3.66$ sq. in., a 2½ in. pipe being the nearest commercial size. Supposing 110 ft. per sec. to be required. Then $1.27 \div 110 = 0.0115$ sq. ft. 144 sq. in. $\times .0115 = 1.66$ or a 1½-in. pipe.

All of this is for 2-pipe direct-heating. If single pipe work is to be used an area equal to supply and return of 2-pipe work must be used.

To illustrate this, the 25-ft. velocity called for 7.2 sq. in. Multiply this by 1.5 (or area of supply and return pipes in 2-pipe work). Then, $7.2 \times 1.5 = 10.8$. The nearest commercial size is a 4-in. pipe, which would be required for single-pipe work at 25-ft. velocity. At 50-ft. velocity, a 3-in. pipe would be needed and at 110-ft. velocity a 2-in. pipe.

These high velocities should not be attempted on house-heating. With 2 to 5-lb. pressure a velocity of from 25 to 50 ft. per sec. is as high as should be attempted.

If indirect is to be used, double the area in square inches of 2-pipe direct requirements.

Many fitters who have not had the opportunity to study into this question of relation to water-line of boiler and velocity, often erect jobs with pipe so arranged that a drop of at least 30 to 40 in. is required to equalize, and yet they will not have, sometimes, half of that.

Of course, the water "goes out" of gage-glass before a pound of steam is registered and a great howl goes up about the boiler. Yet the trouble was not in the boiler. This book is being written that those, who will, may take a few moments to multiply, add, subtract, and divide figures and figure out for themselves where the trouble is, or else do better, and figure out in advance what piping will be right in a given case, thus saving themselves many hours of hard work and perhaps many troublesome hours with an irate owner.

It is exceedingly doubtful if any boiler-manufacturer ever sent out a steam-boiler which would not maintain a steady water-line if the piping had been properly adjusted to the conditions in which it was set.

Friction in fittings causing decrease in pressure seems to be very generally overlooked by the average steam-fitter. He probably has about his office a "List of Pipe-Sizes for Steam and Hot-Water Heating," and this is rather blindly followed under any and all conditions. Fortunately, these lists of sizes are for the most part comparatively safe for house-work but often fail on very compact jobs with many radiators and on the other extreme of very long runs of pipe with many elbows.

(To be continued.)

SOUTHERN NOTES.

Business with the plumbing and heating firms in the larger centers of the South seem up to the average for August.

The Browne & Borum Co., N. Second St., Memphis, Tenn., reports an unusually active season. It is at present busy with the plumbing work on the Baptist Memorial hospital and the Colored Masonic Lodge building.

J. A. Bailey & Co., Memphis, are doing the plumbing on the factory building of the Memphis Bag Co. They are also doing the plumbing on one of the most elegant residences of that section, that of Capt. Jas. Lee, of Memphis, owner of the famous Lee line of steamers, also the R. H. Vance residence on Belvidere boulevard, and the new apartments being built by Mrs. Paul Townsend on Jefferson Ave.

The David Grewar Co., Nashville, is putting down about 10,000 ft. of water main for the Standard Golf Club. This company also put in two large 80-h. p. boilers in the Life and Casualty Co. building, the old Chamber of Commerce. The same company is doing the plumbing work on the M. G. Grissom residence at Lebanon, Tenn., and in John Cartwright's residence, Belmont Heights, Nashville.

Dugger & Willis, Mt. Pleasant, Tenn., have finished the plumbing work on the Mt. Pleasant opera house and the U. S. post office there.

Brew, Reynolds & Co., 914 Broadway, Nashville, Tenn., have the contract for the plumbing on the Fraternity House of the Phi Kappa Epsilon house, Vanderbilt University, and on the residence of Alex Weinbaum. This company also has the contract for the plumbing and heating on the Lawrence County high school, at Lawrenceburg, Tenn., winning it after a spirited competition.

The contract for the work of improving the federal building at Helena, Ark., has just been awarded to the Southern Plumbing and Heating Co., Helena, Ark., the company's bid being $4,250.

Kean & Gallagher, Nashville, Tenn., have the contract for the plumbing on the W. D. White residence on Twenty-first avenue in that city.

Fire which destroyed the plant of Cumberland Foundry, Nashville, one day last week, also did serious injury to the machine, plumbing and heating establishment of John Bouchard & Son in that city.

The contracts for the plumbing and heating in the Jefferson street schoolhouse at Chattanooga, Tenn., were awarded some days ago to Pechman & Pechman in that city by the board. Their bid was $3,572.19.

At Little Rock, Ark., the plumbing firm of Pfeifer-Himstedt Co. has had a baseball team this season among its employes that has scored many triumphs.

QUESTIONS AND ANSWERS

RATE OF CHANGE OF AIR IN A CLOSED ROOM.

Editor "Domestic Engineering": I note in your July 23d issue on page 111, the article on "Rate of Leakage of Air in a Closed Room."

It would be interesting, from a heating engineer's point of view, to know whether this room had one, two or three sides exposed. What air space was there over the ceilings, and the class of roof? Also what wind-pressure there was against the exposure during the time the test was made?

The air changes vary greatly between a room on a corner and one in the middle of a building, or only one side exposed. This is true when the wind-pressures are equal and the sash equally loose or tight according as the the building is old or new. So that two rooms of the same cubic contents do not require the same amount of radiation to care for the air changes, if one is a lower room and the other an inside room, or if it has an exposure. No definite rule has as yet been established as to what the air-changes might be in rooms of dwelling-houses with the two different exposures and windows being reasonably tight. But tight windows are very scarce things in parts of this country, and usually the older the building the looser the windows.

So that with reasonably tight windows in the corner room, one change per hour would be all that need be provided for with a wind-pressure of say 8 miles per hour. While the one-exposure room would not change its contents under the same conditions but once in 4 hours and practically it need not be considered. With loose windows, however, the corner-room might change four times per hour, and the one-exposure room once per hour. So that it is well for the heating engineer to look well to his air-changes at all times and use his best judgment here and his largest factor of safety, because it is when the wind-pressure is 40 miles per hour that the users of the system will have their hardest kicks coming if the system has not been planned to care for air changes.

Yours truly,

Little Rock, Ark. A. J. Purcell, C. E.

PIPING TO STEAM RADIATORS.

Editor "Domestic Engineering":—I have read with great pleasure and a great deal of profit the series of articles by Mr. Pierce in your most instructive paper, but in the article which was published in the number of August 6th I notice something that I would like to have discussed more at length. On page 148, Fig. 6, the distance from the water-line to the return-pipe is shown as 60 in. Mr. Pierce says on page 149: "The pipes being connected as per Fig. 6 (the one I refer to) the line of the water-gage is steady as when discharging to outer air." I have no doubt whatever of the statement, but there is a point to be taken into consideration in this matter. Here it is: How many jobs, as we are compelled to install them, could you get that height on?

The "Ideal Fitter" gives the "height to top of outlet in inches," in the type of boiler Mr. Pierce has shown, "as being from 45 in. to 75 in.," or 3 ft. 9 in., and 6 ft. 3 in. respectively.

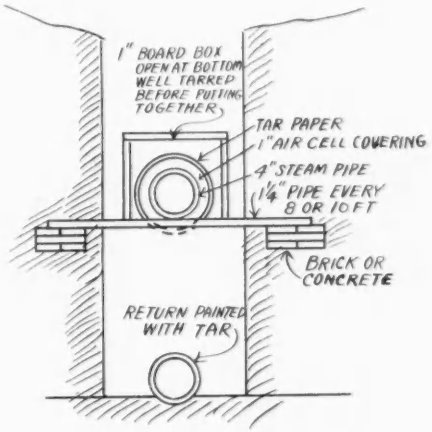
To this you must add the 60 in. and then you have 8 ft. 9 in. and 11 ft. 3 in. as the height that you would have to run the mains as he has shown in the illustration.

The objection is that the ordinary cellar is about 7 ft. in height. On many old houses you have to grapple with a 6 ft. cellar. In an experience covering over 20 years I can state that I have but twice seen a 10-ft. cellar. In such a case as this I should be glad to know how Mr. Pierce would get around the difficulty? Perhaps he has provided for it in a future number, but I thought that I would write, as it is a point too practical to be neglected.

Clyde, N. Y. J.

HOW TO COVER A STEAM-PIPE IN A DITCH.

Editor "Domestic Engineering":—Enclosed find sketch showing how to cover a steam-pipe in a ditch. This is simple but effective and will answer the question in your issue of July 23rd on this subject. I think it better than tile, unless wet ground prevails, and it is much easier to


1" BOARD BOX OPEN AT BOTTOM WELL TARRED BEFORE PUTTING TOGETHER
TAR PAPER
1" AIR CELL COVERING
4" STEAM PIPE
1¼" PIPE EVERY 8 OR 10 FT
BRICK OR CONCRETE
RETURN PAINTED WITH TAR

Showing Steam-Pipe Covering.

put on. When putting on the air-cell covering, the installer should be careful to see that all the ends, where they come together, are made perfectly tight by putting in asbestos cement and covering with the canvas jacket. Hoping this suggestion in my letter may be of some service, I remain, yours truly,

Omaha, Neb. Jos. W. Moore.

THE UNSTEADY WATER-LINE IN BOILERS.

Editor "Domestic Engineering":—In the issue of August 6th, I note that Mr. Pierce has something to say in regard to the water-line of boilers. The recommendations he gives seem to be all right, but I doubt if one could secure the amount of height necessary in the ordinary basements.

Some boilers are very rapid steamers and will throw the water into the mains, no matter how much pains one may take with the piping and the pipe-sizes. I will relate a case: In a job that I was called upon to fix, the water-line of the boiler was very uncertain. Sometimes they had it and at others they didn't. It was an overhead sys-

tem, about 1,500 ft., the main rising direct to the attic and branches taken off to supply the radiators. At 2 or 3 lb. pressure several of the radiators failed to heat and at 8 or 10 lb. the water left the water-glass.

Now I did not change a single radiator or steam main. At the back of the boiler I placed an "equalizer" in the shape of some 2½ in. pipe properly connected to the boiler and the job at once worked all right. It heated all right on from 3 to 4 lb. I can not give further measurements than are given here, for I did not make them.

What I want to know is, does Mr. Pierce consider that it is ever necessary to use the "equalizers," and will he give us a chapter on the same before the close of the series?

Des Moines, Ia. D. H. C.

THE WATER-GLASS AND ITS CONNECTIONS.

Editor "Domestic Engineering":—We sometimes have conditions thrust upon us to grapple with that cause much trouble, irrespective of pipe sizes. I note what Mr. Pierce says regarding "piping steam-boilers" in a previous number of the paper and I wish to relate an instance.

Some time since I put in a job of steam-heating that failed to give satisfaction. The water would leave the glass and we never could tell how it stood in the boiler. I used the same system that I had used many times before with success. In looking the job over I came to the conclusion the mains needed "bleeders." So I put them on at an added expense and the job worked no better than before. I examined the job more carefully and then I saw that the connections of the water column were a little different. The bottom connection went into the boiler at the same height as the return, or at the bottom of the fire-pot.

I went to work and changed it so as to make it go into the ring above the fire-pot and the job worked perfectly.

From which instance it may be seen that all manufacturers do not each and every time get things exactly right at the factory.

Omaha, Neb. M. M.

DIRT AND THE PLUMBER.

Editor "Domestic Engineering":—In one of the previous issues of your journal you asked for suggestions about what would benefit the master plumber of to-day most. The master plumber stands for sanitary improvement—or to speak plainly, he is forced by the progressive spirit of the age into a place where he must represent certain sanitary improvements. Now a thing can not be dirty and at the same time, sanitary, yet I submit that the average journeyman plumber is about the dirtiest mortal that walks. Likewise the average place of business is anything but a beautiful garden of roses. As a representative of what should be the cleanest and most convenient room in the house does not the plumber (either master or journeyman) occupy a most ridiculous position in trying to preach sanitation?

Would he not hit nearer to the mark if he occupied his time for a while in cleaning up his own dooryard, speaking literally. They say that it takes about forty years to get any great change absorbed by the general run of mankind and if that is so, we are coming down the home stretch and due for a change before long in the plumber's manners.

Let us hope that the next generation will not acquire the habit of wearing their overalls until the garments are so rotten with dirt that they fairly drop off the being, who so disgraces the trade.

Perhaps in the future we can go past the window of a plumbing shop and find that it is not filled up with dead flies and spider webs galore. To my mind both the plumber and his shop need considerable scrubbing up before poising even as a second-class model for anything along the lines of sanitation.

New York City J. H.

WANTS A NEW GAS-LIGHTING DEVICE.

Editor "Domestic Engineering":—In many large cities where they have gas for street lighting, it requires men to light the lamps and also to put them out. Now, I am not of an inventive disposition, but it seems to me that someone who is an expert on valves could get up something in the shape of a valve or something else whereby the putting out of lights would be eliminated. That is to say, a valve or device of some sort would have to be put on each post and when the man came around to light the lamp he would set this device so that it would extinguish itself at whatever time it was set. This would also have to be arranged so that it could be set to extinguish at whatever time desired. Not only would this be good for street lighting, but for many apartment houses and tenements where the janitor is required to turn out the gas in the front halls at 10 or 11 p. m. This would also be good for stores where the windows are arranged for gas lighting. Trusting that you will see enough in this article to publish it so somebody can get busy and expecting to see this device put into operation some time in the near future, I remain, yours truly, "North Dupont."

THE TEN BEST BOOKS.

Editor "Domestic Engineering":—Your editorial on "Two New Legacies for All Plumbers Everywhere," in the issue of August 6th, has put a thought into my head We have, for a fact, few books relating to our craft and business. When one desires to read the best he is at sea unless he has read all. Why not have those, who have read extensively, send in lists of say, the ten best books to read? It will greatly assist those who have not much time and have had little experience in reading such works. Will you not publish this and let different people send in such lists? Make a list of ten heating books and then ten plumbing books. The man who has a small amount of both time and money I would ask to make a list of just ten books, five on heating and five on plumbing.

Cincinnati, O. Vim.

H. O. CANFIELD DEAD.

The death of Henry Ogden Canfield, president of the H. O. Canfield Co., Bridgeport, Conn., has just been announced by his company. His demise occurred on Monday, July 25th, at his home in that city. Mr. Canfield was the founder of the company, which bears his name, and which has for many years made high-grade plumbers' rubber goods.

GEO. W. WHITE PASSES AWAY.

Geo. W. White, one of the leading master plumbers at Newport, Ky., died at his home in that city on Wednesday evening, August 10th, from typhoid fever, in his 46th year. Mr. White's 16-year-old daughter died last winter, and it is thought that his deep sorrow on this account hastened his end. He was secretary of the Newport Master Plumbers' Association and had a large circle of friends both in and outside of the trade who will mourn his untimely demise.

A Study in Centralizing the Heat Supply*

By J. D. Hoffman, Lafayette, Ind.

(Concluded from page 108, July 23rd issue.)

Capacity of the Typical Plant and the Amount of Radiation supplied by the Exhaust Steam:—Following the general discussion of the value of exhaust steam in heating systems, it would be well to assume a specific case for the sake of argument. The first thing to be determined is the capacity of the heating plant, which is to form the basis of the discussion. Suppose, for example, that there is an electric-lighting and pumping station in the district, having 23100 pounds of exhaust steam per hour (maximum) from the lighting and power units and a constant supply of 8680 pounds of exhaust steam from the city water-supply pumps, (see Fig. 1, taken from the daily plant output.) Suppose also that this amount be considered sufficient to justify a design of 184500 sq. ft. of hot-water radiation (123000 sq. ft. of steam) in the district. This amount of radiation should have about 184500 gallons of water allowed per hr. to supply it and it would in all probability call for a 12-inch pipe. With a pressure of 65 lbs. per sq. in. on the outgoing line and 20 lb. per square in. on the return line, the direct acting steam pumps will consume about 127.2 h. p. which at 100 lb. of steam per h. p. hr. will give off 12,720 lb. of exhaust steam per hour. This when added to the exhaust steam from the engines and the city supply pumps gives a maximum of 44,500 lb. of steam per hour to be used for heating the circulating water in the heating systems. Now since one lb. of exhaust steam may be safely counted on to give up 800 B. t. u., as previously stated, and since each lb. of water going through the plant, is heated through a rise of about 30 degrees, thus giving it 30 B. t. u., one lb. of exhaust steam will heat $800 \div (30 \times 8.33) = 3.2$ gallons of water. Stated in other words, one lb. of exhaust steam will supply 3.2 square feet of radiation in the district for one lb. on a zero day, and the 44,500 lb. of steam would supply 142,400 sq. ft.

Amount of radiation in the district that can be supplied with heat by an economizer in the stack gases located between the boilers and the chimney. In order to make this estimate it is necessary, first, to know the horse-power of the boilers, the amount of coal burned per hour, the pounds of gases passing through the furnace per hr., and the heat given off from this gas to the circulating water through the tubes. From a previous statement, 44,500 lb of steam per hour is generated in the steam boiler plant at a pressure of 125 lb. gage. To find the boiler horse-power, let the total heat of the steam at 125 lb. gage be 1191.8 B. t. u. and the temperature of the incoming feed water to the boilers be 60 deg. (In most cases the feed water will be at a higher temperature, but since it may occasionally be as low as 60 degrees this value should be taken). The heat put into one lb. of steam is, therefore, $1191.8 - 60 + 32 = 1{,}163.8$ B. t. u., and in 44,500 lb. it will be 51,789,100 B. t. u. Since one horse-power of boiler service is equivalent to $34.5 \times 969.7 = 33{,}455$ B. t. u., we will have $51{,}789{,}100 \div 33{,}455 = 1{,}548$ boiler horse-power. This horse-power will take care of all the engines and pumps in the plant. If the coal used contains 13,000 B. t. u. per lb. and the boilers have 60 per cent efficiency, then $13{,}000 \times .60 = 7{,}800$ B. t. u. given to the water per lb. of fuel burned.

The quantity of coal burned per hr. will be $51{,}789{,}100 \div 7{,}800 = 6{,}640$ lb. total. This means $6{,}640 \div 1{,}548 = 4.3$ lb. of fuel per boiler h.-p. hour. It also means 6.7 lb. of water evaporated per lb. of fuel if the flue gases have 12 per cent C. .02 then there is being used about 21 pounds of air or 22 lb. of the gases of combustion per lb. of fuel burned. This is equivalent to $6{,}640 \times 22 = 146{,}080$ lb. of flue-gases total. Suppose now that these gases leave the furnace for the chimney at a temperature at 550 degrees F., that the economizer drops the temperature of the gases down to 350 deg. (a condition which is very reasonable), and that the specific heat of the gases is about .22, we have $146{,}080 \times .22 \times (550 - 350) = 6{,}427{,}520$ B. t. u. given off from the gases in passing through the economizer. This heat is taken up by the circulating water in passing through the economizer toward the outgoing main. Now if the water, as it returns, from the circulating system, enters the economizer at 150 deg. and leaves at 180 deg., we will have $6{,}427{,}520 \div (180 - 150) = 214{,}251$ lb. of water heated per hour. This is equivalent to supplying $214{,}251 \div 8.33 = 25{,}720$ sq. ft. of radiation per hour when the plant is running at its peak load. Taking the "pounds of steam per hr.," in the above as the only variable quantity we are fairly safe in saying that the heat in the chimney gases from one h.-p. of steaming boiler service will supply, through an economizer, 16.5 sq. ft. of radiation in the district.

Boiler Horse Power Necessary to Heat the Radiation Not Supplied by the Exhaust Steam and the Economizer:—Since the economizer surface from one boiler h.-p. will supply 16.5 sq. ft. of radiation in the district on a zero day, that from 1,548 boiler h. p. will supply 25,720 sq. ft. of radiation; also, since 44,500 lb. of exhaust steam will supply 142,400 sq. ft. of radiation on a zero day, we have a total of 168,120 sq. ft. supplied by both methods. It is evident then that 16,380 sq. ft. must be heated by some other method. It is probably not safe to estimate too closely on the amount of exhaust steam given to the heating system. The maximum amount of 44,500 lb is obtained, in part, by pumping one gallon of water per hr. for each sq. ft. of radiation, and in part, by pumping city water. In the first case, less water than this may be pumped even on the coldest day. This is possible, first, because water may be carried at a higher temperature than that stated, and, second, because there may be less loss of heat in the conduit, thus giving more heat per gal. of water to the radiation. In the second case the demands upon the city water supply are not very constant and are difficult to estimate. All things considered, probably it would be better to take a much lower value, say 35,000 lb. of exhaust steam per hr., and 112,000 sq. ft. of radiation supplied. If this view point be taken, then the exhaust steam, and the stack gases together with heat 137,720 sq. ft., and there will be left 46,780 sq. ft. to be heated by other means.

Suppose it be the desire to install steaming boilers and to use these boilers as heaters for the remaining radiation.

One boiler h.-p. is equivalent to 33,455 B. t. u. per hr., and will supply $33{,}455 \div (30 \times 8.33) = 133.7$ sq. ft. of radiation. From this we will need $46{,}780 \div 133.7 = 350$ boiler h. p. to supply the defficiency. Because of the very safe figure taken in the amount of exhaust steam, it is readily seen that a 300 h.-p. boiler would be sufficient. This would be installed in addition to the other boilers that are used as steaming boilers.

By Fig. 1 it will be seen that the minimum load on the steaming boilers carries through six hours out of the entire day and that the load at this time is approximately 50 per cent of the maximum. At such a time the exhaust steam drops to 22,890 lb. per hour and, since the calculations were

*Read at the 2nd annual meeting of the National District Heating Association, held at Toledo, O., June 1-3, 1910.

based upon 35,000 lb. per hour, we have only 66 per cent of this radiation supplied. Again, the economizer service is reduced 50 per cent, we have then .33 × 112,000 ÷ .50 × 25,720 = 49,820 sq. ft. of radiation to be cared for by some other means during the six hours. This may be by heating boilers, and would require 49,820 ÷ 133.7 = 372 boiler h. p. One additional boiler may be added for this purpose or one or two of the steaming boilers may be piped for both steaming and water service. When the steaming requirement, is low, these boilers may be turned into the heating system as heating boilers.

Estimates of Costs in Heating Plants:—One of the first investigations toward centralization should be to make an estimate of the initial cost of the centralized system as compared to those of the independent ones that will be replaced. The following gives what may be taken as a close average value for such a plant. The installation expense of the hot-water central-station system is much greater than that for

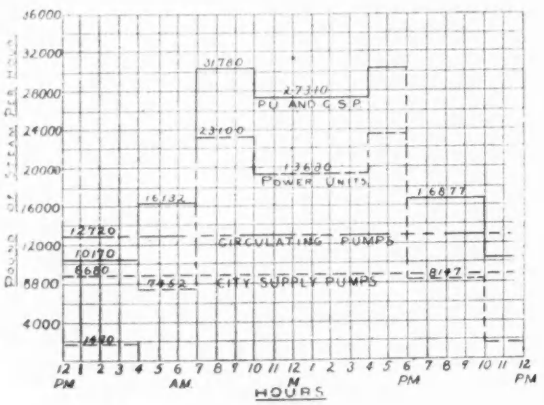


Fig. 1.

steam and is for that reason used for comparison in this case. If a saving could be shown on this type of system, then the steam system would show much more saving in first cost and depreciation.

Conduits. (Two Pipe.)

Installed complete, not including expansion joints and not including the cutting of pavements.

	Average estimated cost of four kinds of conduits per foot in length.	Total.
100 ft. of 12 in.	7.31	$ 731.00
500 ft. of 10 in.	6.12	3,060.00
1,500 ft. of 8 in.	4.75	7,125.00
5,000 ft. of 6 in.	3.47	17,350.00
2,000 ft. of 5 in.	3.00	6,000.00
7,000 ft. of 4 in.	2.12	14,840.00
2,000 ft. of 3 in.	1.76	3,520.00
Total cost of all conduits		$51,926.00
264 service connections (see Private Plants) average $25.00		6,600.00
Expansion Joints, one 10-in., five 8-in., 16 6-in., six 5-in., 23 4-in., and six 3-in.		2,000.00

Power Plant.

Four—horizontal reciprocating pumps (60,000 gal. each) at	$ 1,500.00
Two—1,000 sq. ft. condenser-reheaters, installed	3,000.00
One—Co-Mingler (barometric condenser), installed (1,500 lb. steam per hour)	900.00
Economizer, 6,500 sq. ft., installed	8,000.00
One—300 h. p. water-tube boiler for heating, installed,	3,000.00
Other piping in plant, separators, etc.	5,000.00
Additional building and land	5,000.00
Total for all conduits and plant	$91,426.00

Private Plants.

Assume the average residence to have 700 sq. ft. of hot-water radiation exclusive of mains and risers, then the centralized system will replace 264 private plants, and the estimated cost for each plant will be about as follows:

1,500 sq. ft. boiler and foundation	$150.00
700 sq. ft. C. I. radiation	160.00
Pipes, valves, fittings, hangers, and ceiling plates	65.00
Specialties and sundries	40.00
Labor, painting and bronzing	85.00
Total for one plant	$500.00
Total for 264 plants	$132,000.00

From the above we are able to make economic comparisons between the single and the multiple systems for installation, depreciation and interest, and operation. Let coal cost $6.50 and $2.00 per ton, respectively, for private and central plants. Let the heating year be 5,040 hours, and let the depreciation be 6 per cent, and the repairs and interest upon the investment be 8 per cent, then we obtain the following:

	264 plants.	Central Plant.
First cost of plant.	$132,000.00.	$91,426.00.
Depreciation at 6 per cent for 5 years	39,600.00.	27,427.80.
Repairs, Interest, etc., at 8 per cent for 5 years	52,800.00.	36,570.40.
Cost of labor for operating for 5 years, of 210 days each year, 1 hour per day, at 30 cents per hour	83,160.00.	
Salary and labor for operating 5 years, of 210 days. Salary for one-half man $4,500, the other half charged to power plant. Labor four men for 5 years. $12,000.		16,500.00.
Cost of coal: Each private plant 12 tons per year at $6.50 for 5 years.	102,960.00.	
Cost of coal at central plant, $2.00 per ton, all direct firing, no exhaust steam, for 5 years.		80,470.40.
Cost of coal at central plant: Estimated 71 tons needed, total, $2.00 per ton, Zero day, 50 per cent charged to the heating system, the balance of the heating being cared for by the exhaust steam.		71.00.

It is assumed in the above that a good grade of hard coal is used in the private plant that a medium grade of soft coal is used in the central plant. This is a reasonable distinction because of the better facilities for burning the cheaper coals in the large furnace units.

In determining the fuel cost of the private plants it was not worked out from a theoretical basis, but an average was taken from a number of plants of about the size of the one in our study.

In determining the fuel cost of the central plant it was

worked out theoretically, but in this also it is possible to obtain only an approximate result. In the first place the outside temperature is continually changing, and the temperature of the water in the conduit has to be changed to suit these outside temperatures, hence the conduit loses vary greatly. In the second place, labor and fuel costs are so interrelated in the various parts of the power and heating plant that it is difficult to apportion them.

Concerning the outside temperature changes, the government records for the lowest average temperature for 7 months, beginning October first and ending May first, in the locality where the writer lives, during the 20 years preceding 1910, was 32 deg. If now the radiation be figured for an outside temperature of zero degree, the ratio of the heat loss on the average day compared to that of zero weather is (70 — 32) ÷ 70 = .54. The following then figured upon this basis, may be taken as a fairly close estimate for the value of the coal used in five years, direct firing. Where no exhaust steam is used, 184,500 × (30 × 8.33) = 46,125,000 B. t. u., per hr., to heat the district on a zero day. 54 per cent of this value gives 24,907,500 B. t. u. per hr., for the average day, if coal is worth 13,000 B. t. u., per lb., and the furnace is 60 per cent, efficient, we have 24,907,500 × 24 ÷ (13,000 × .60) = 76,638.48 pounds of coal needed for the average day. For 210 days per year for five years, and with coal at $2.00 per ton, of 2,000 lb., this gives $80,470.40.

Suppose, now, for argument, that the exhaust steam would be credited for part of this heating. Our typical plant gives the following amounts, exclusive of that used in the circulating pumps, which is charged to the heating system as direct firing.

Exhaust Steam Available.

Power Units.

	1,490×6=8,940
	7,452×3=22,356
	8,197×4=28,788
	23,100×5=115,500
	18,630×6=111,780
24	286,364
City supply-pumps	8,680×24=208,320

Total, all exhaust steam excepting that from the circulating pumps, 494,684 lb. per day. This amount of exhaust steam per day is equivalent to 20,611.83 per hr., providing it could be evenly distributed throughout the 24 hrs. of the day. With 3.2 sq. ft. of radiation supplied by one lb. of exhaust steam, we have 20,611.83 × 3.2 = 65,957.87, and this for the average hour in the heating year would be 65,957.87 ÷ .54 = 122,144 sq. ft. of radiation supplied by the exhaust steam. Then 122,144 ÷ 184,500 = .662. This shows that there would be enough exhaust steam, if it could be distributed to suit the outside conditions, to supply 66 per cent of the entire radiation in this plant on an average day. On a zero day this is 65,957.87 ÷ 184,500 = 35.7 per cent.

The economizer, on an average day, will supply 26 per cent, and on a zero day, 14 per cent.

The above exhaust steam and the economizers combined, will supply 92 per cent and 50 per cent respectively of all the radiation on an average day and a zero day.

The fuel cost of heating one square foot of radiation (direct firing) for one heating year of seven months with coal as above, is — 184,500 × 250 × 5,040 × .54 × 200 ÷ (13,000 × .60 × 2,000) = 8.8 cents.

Endeavor to be uniform in your price-quoting. Best work cannot be done at low figures.

A. C. EYNON, VICE-PRESIDENT OF THE N. A. M. P.

It is with pleasure that we present herewith an excellent likeness of A. C. Eynon, Canton, O., the new vice-president of the National Association of Master Plumbers. Mr. Eynon is at the head of A. C. Eynon & Co., one of the leading and most prosperous plumbing concerns in Canton, O. He has for many years been a leader in association work, not only in his home town and in the state of Ohio, but also in the Northwestern Association of Master

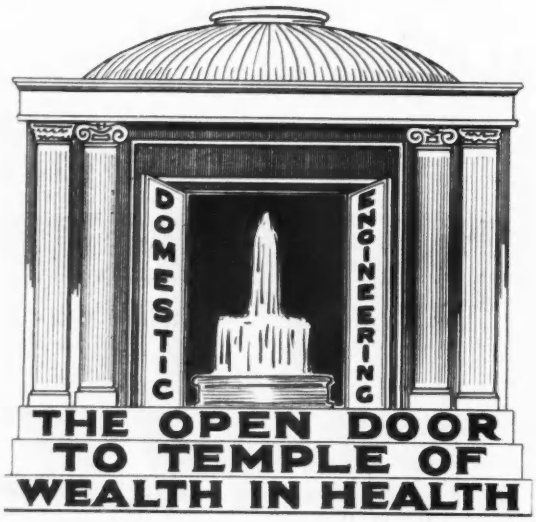
A. C. Eynon, Canton, O., the New Vice-President of the National Association of Master Plumbers.

Plumbers, and he has also done good work as a member of the board of directors of the National Association. It is the consensus of opinion that the last new honor and responsibility which came to him at the Chicago convention was not only well-merited but also well-placed.

OBITUARY.

Daniel J. Wild, Cambridge, Mass., who formerly had charge of all the plumbing work in the public schools of that city, passed away on August 6th at his residence, 5 Gibson St., in that city. For 20 years Mr. Wild conducted a plumbing establishment on Boylston St., near Harvard Square, Cambridge, but during the past six or seven years he had been obliged to give up business and remain at home, an invalid. Death was due to paralysis. Mr. Wild was born in Lawrence, Mass., 53 years ago and has been a resident of Cambridge for the greater part of his life. Before going into business for himself he was employed for a long time by Brock Brothers, plumbers and hardware dealers, of Harvard Square. He is survived by a wife and seven children. Funeral services were held in St. Peter's church on Monday, August 8th.

"Uneeda" copy of "Domestic Engineering" on your desk every week. It unfolds to you the best of the work and thought of your brethren in the craft. Every word and line in our journal are weighed in the balances before publication. Our highest aim is to represent the needs of the industry faithfully. You can assist our work from time to time by comment, criticism and contribution. Begin now to wield a pen in the cause of national sanitation.



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NOTICE TO ADVERTISERS.

Copy and cuts for advertisements intended for a particular issue should reach the office of Domestic Engineering on Monday of the previous week if it is desired that a proof of the advertisement shall be submitted. New advertisements can be received up to noon of Monday of the week of issue, but no proof can be shown.

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SPECIAL NOTICE TO READERS.

Our readers are invited to send in articles on any topics covering sanitary interests as outlined above. Photographs and drawings with descriptions of special interest to plumbers and steam-fitters are welcomed. "Domestic Engineering" pays at space rates for all articles, notes, criticisms and news data so contributed.

Among the Wholesalers

WILL MANUFACTURE HEATING GOODS.

The Warlick Heater Mfg. Co., St. Louis, Mo., has been incorporated with a capital stock of $100,000 to manufacture heating goods. The incorporators are W. J. Warner, Daniel E. Lichty and Jasper Taylor.

CRANE CO. TO BUILD NEW BRANCH HOUSE AT TACOMA, WASH.

Crane Co., Chicago, has awarded the contracts for the erection of its new building at Tacoma, Wash., and work will be commenced on this at once. The structure will be five stories in height, of fireproof construction, and will be used entirely by this concern as headquarters for its Tacoma business and wholesale trade in this territory.

TO MAKE PORCELAIN-LIKE PLUMBING GOODS.

The Agato Co., Milwaukee, Wis., has been incorporated with a capital stock of $125,000, for the manufacture of a porcelain-like material for interior finish, fountains, plumbing goods, etc. A factory will be erected and the work will be conducted on a large scale. The preparation is manufactured from material secured only in Colorado. Temporary officers are: President, A. Loehndorf, and secretary, Dr. L. W. Booth, Milwaukee.

START ON THE NEW GURNEY PLANT.

The Gurney Heater Mfg. Co., Chelsea, Mass., which recently purchased 25 acres of land in South Framingham, Mass., for the purpose of erecting a $250,000 plant thereon, has started in on the actual work of construction. Twenty teams and twice as many men were put to work on the excavating for the cellar last week. All the construction work will be done by the Gurney company direct. The building will be but one story in height and cover a large amount of ground. The company's plant is at present located in Chelsea.

CIRCLING THE GLOBE ON BEHALF OF MANUFACTURERS.

William J. A. Bailey who recently returned from a successful trip around the world representing a number of American manufacturers, is now preparing another business tour. He expects to leave this country early in the fall and will be gone about a year, visiting the leading commercial centers of the world. Mr. Bailey markets his lines in conjunction with permanent sales offices in the different countries so that this trip would no doubt be of interest to manufacturers seeking foreign trade. His address, is 32 Broadway, New York City.

HENRY MUELLER IS DEAD.

Henry Mueller, vice-president and mechanical expert of the H. Mueller Mfg. Co., Decatur, Ill., died suddenly of apoplexy on Saturday morning, August 13th, at his residence in that city. His death will come as a shock to his many friends in the trade in all parts of the country as it was entirely unexpected. Lately he had appeared in even better health than usual. Last spring he felt run down and he went to Hot Springs, Ark., where he remained three or four weeks. He seemed much benefitted by the trip, and only a few days ago his brothers remarked that Henry was looking better than he had looked before in years. Friday he had a slight dizzy spell and fell from his bicycle, but was unhurt and said nothing about it, and in a few minutes he was all right again.

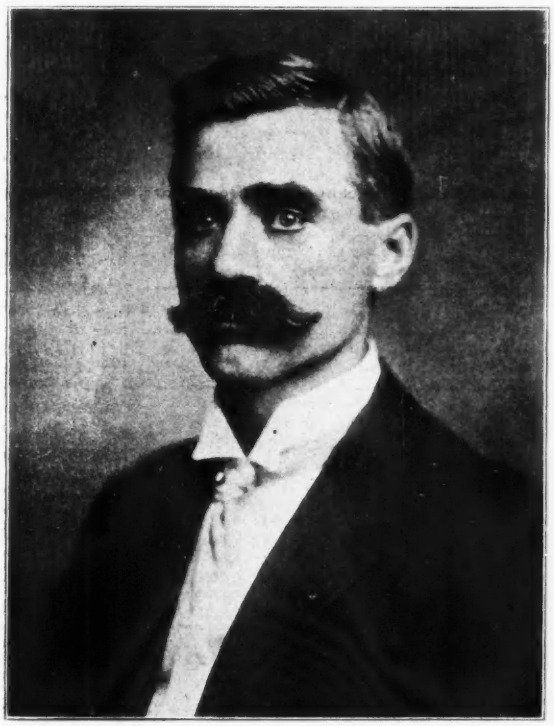
Saturday morning he went out to the garage. The supply of gasoline in the large tank there had given out and Mr. Mueller sat down on a stool to figure out how many miles his car had traveled on the supply of gasoline that had been in the tank. The colored chauffeur, who was working in another room, heard something fall, but thinking Mr. Mueller had knocked over a stool, he paid no attention to it at the time. In a few minutes afterward he had occasion to go into the room where Mr. Mueller was and found him lying on the floor. Help was summoned and the stricken man was carried into

the house. A physician was immediately summoned, but Mr. Mueller, after moving his lips a few times, expired before medical aid could reach him.

In Decatur, Henry Mueller was known and liked by everybody. He was never inclined to push himself forward but he was always mindful of the welfare of others. With the other members of the company he was always ready to do anything to push Decatur to the front. His public spiritedness could never be questioned.

An evidence of his thoughtfulness and considerateness occurred early Saturday morning. Saturday was his wife's birthday anniversary. He got up early and went out and bought a handsome bouquet of roses and placed them on her table, where she could see them when she got up. He was a man of few words and of a retiring disposition, but was companionable and had a host of friends. He was always considerate of the welfare of the employes of the firm, and was held in high esteem by them.

Henry Mueller was the oldest of the Mueller children and aside from the death of his father in 1900 and the death of his 2-year-old daughter a month or so ago, this is the only death to occur in the family. He was born at Freeport 52 years ago last March. Soon afterward his



The Late Henry Mueller.

parents moved to Decatur and this has been the family home ever since. After completing his schooling there he entered his father's machine shop and became a mechanical expert. He was intimately associated with his father in the latter's work of designing and inventing. He was a thorough machinist, studious and practical and was considered one of the best men in the country in his line of work.

When the H. Mueller Manufacturing Company was organized he became the head of the experimental department, designing the new patterns of goods and securing many new patterns. He was an invaluable man in that department. He acted as president of the company for awhile after the death of his father. Later he became vice-president and held that office at the time of his death. He was actively associated with Phillip Mueller in the management of the factory. His judgment was excellent and his advice always reliable.

He is survived by his wife and little daughter, his mother, Mrs. A. Fredericka Mueller, five brothers, Philip, Fred B., Robert, Adolph and Oscar Mueller, and one sister, Mrs. Ledah Cruikshank.

All the members of the family were in Decatur at the time of Mr. Mueller's death, except Oscar Mueller, manager of the eastern branch, who was in New York, and Fred B. Mueller, who was in Pittsburg. Both were telegraphed for and arrived home Monday in time to attend the funeral, which took place on that day. The Mueller factory was closed down Saturday morning at 10 o'clock and remained closed until Tuesday morning, the day after the funeral.

PERSONAL MENTION.

Edward W. Philpott has been made general manager for the Sanitary Co., Cleveland, O.

Clifford Pfau, treasurer of the Pfau Manufacturing Co., Cincinnati, O., is on an extended visit in the east. The Pfau Manufacturing Co. reports good business and enthusiastic appreciation of its new calendar, which has been widely distributed to the trade.

George Albert Moore, for several years assistant manager of the Chicago branch of the United States Heater Co., of Detroit, Mich., has been transferred to the general offices of the new United States Radiator Corporation at Dunkirk, N. Y., where he will look after the sales of the Capitol product of that company. Mr. Moore will be temporarily located at Detroit until such time as the offices there are transferred to Dunkirk.

B. A. Berger, of the B. A. Berger Manufacturing Co., Richmond, Va., is in Chicago for a few days on his way home from a western business trip. This company manufactures steel sink-brackets and other steel specialties. Mr. Berger is enthusiastic over two of his latest achievements. One is a boiler-stand, with three legs of extreme rigidity and graceful shape. It is adjustable in height and it should prove attractive to live plumbers, seeking the installation of the best goods. The second Berger product is a convenient hose-reel, also of steel construction, and so constructed as to successfully resist all the erratic treatment that hose-reels generally receive from vigorous consumers and guilty bystanders.

Alonzo A. West, a master plumber of Malden, Mass., has just returned from a trip around the world. Mr. West left San Francisco last December in search of health and visited nearly every civilized country during his trip. He returned in the best of health and spirits.

CORCORAN PROPHECY.

The prophets are not all dead yet. The Allyne Brass Foundry Co., Detroit, Mich., is following on the track of Saul and prophesies the passing of the wipe-joint in a booklet entitled "The Corcoran Lead-Pipe Couplings." A wrench is to take the place of the iron and the furnace must be discarded perforce. How this prophecy is to be fulfilled in commercial use is fully illustrated and described in this interesting booklet. Corcoran's a prophet for profit. Write, receive and read, and say D. E. told you to.

A SLEEPLESS BRAIN.

The brain controls the bodily motion and generally acts as headquarters for the direction of body functions. Human brains require sleep, however, as a time of recuperation. When they are thus resting, house-temperatures are liable to fall to the point of discomfort. The Jewell Manufacturing Co., Auburn, N. Y., has invented and perfected a sleepless brain in the form of an automatic heat-controller. "It never sleeps; it never forgets. It is a jewel." So say the Jewell folks. A most attractive booklet has been issued last week by the company, offering these "brains" for sale, and describing and illustrating their efficiency in a graphic way. Napoleon's brain was one of the most perfect in control known to history. He could command sleep instantly; he could wake to the second at any time he wished. The Jewell "brain" is Napoleonic in action. Its control will maintain any temperature you require for a given time and will give you any pre-determined temperature at any set hour. It abolishes the wintry morning shiver and makes "The House Comfortable." By the way, that is the title of their booklet and you can get it free for the asking. It's good reading.

NEWARK MASTER PLUMBERS' 17TH ANNUAL OUTING.

The Master Plumbers' Association, of Newark, N. J., held its 17th annual outing at Witzel's Point View Grove, College Point, L. I., on Thursday, August 11. A clear sky brought out a large crowd nearly 200 members and guests being on deck when the steamer "Newark" left from the foot of Market street, Newark, at 10 o'clock in the morning, with the band playing on the forward deck and all hands in high good humor.

A most delightful sail up the East River was enjoyed, during which refreshments and cigars were served, while the band rendered several very excellent selections of music. President Louis Maier, of the Newark Association, was untiring in his efforts to see that everybody had a good time, and Secretaray S. F. Wilson was also much in evidence and contributed his share to everybody's enjoyment, while the several committees in charge of the affair also did excellent service in this direction.

The first number of the program after reaching College Point about 12:30 was a tug-of-war between the Master Plumbers and the Newark Master Carpenters, who also held their annual outing there on that day. The Master Plumbers were the victors.

The bugle call for dinner received everybody's attention. To the strains of music the entire party got in line and marched to the dining room where an elaborate dinner was enjoyed.

The afternoon was spent in the enjoyment of various games the most notable being a baseball game between two picked teams, master plumbers and supply men being on both teams. The contestants were known as Garrigan's team and Pree's team.

The members of Garrigan's team were: Garrigan, McCormack, Brady, Lewis, Pollard, Lee, Kraft, Wood and Canfield.

Pree's team consisted of: Pree, Frielich, Berla, Kenny, Morretta, Nichols, Martin, McElroy and Eisner.

Garrigan's team won the game, with a score of 9 to 2.

Among the many guests of the Newark association were the following prominent master plumbers: A. Selden Walker, East Orange, N. J.; president of the National Association of Master Plumbers; William McCoach, Philadelphia, treasurer of the National Association; National Directors James Carey, of Baltimore; T. A. Hill, of New York City; former National Secretary Thos. S. Cochrane, Jr., New York City; State President Isaac A. Brown, New York City; State Vice President Harry Farrell, Camden, N. J.; State President Geo. S. O'Neil, Paterson, N. J.; James H. White, Frank Vreeland, John Baker, Jos. Maher and Robt. Quinn, all of Paterson N. J.

The supply fraternity was also well represented, as the following list will show:

C. J. Weller, of the Boynton Furnace Co., New York City; Al De Vos, of the Thatcher Furnace Co., New York City; DeWitt Cook, of W. V. Egbert & Co., Newark; M. B. Garrigan and Jos. Vreeland, of Roe & Conover, Newark; J. W. Depree, of the Good Mfg. Co., New York City; W. S. Roe, of Newark; Mr. Lang, treasurer of the Newark Supply Co., Newark; H. W. Limes, of the John Douglas Co., New York City; Char : Wood, of the Keasbey & Mattison Co., New York City; James Dorn Brady and John J. McHale, of the N Crum-Howell Co., New York City; A. T. Meeker and f. Nichols, of the Alberene Stone Co., New York City; W. A. Birdsall and Ray Condit, of the Model Heating Co., New York City; G. O. Meyer, of the Newark Supply Co., Newark; Thos. Hoover, of the Van Ness Slate Co., New York City; W. F. Kraft, of the Richardson & Boynton Co., New York City; T. Frylinck, of Woodward & Wanger, Philadelphia; E. Stephan, of Fee & Mason, New York City; G. F. Perry and N. R. Perry, of G. F. Perry & Co.; W. O. Steele, of the Faitoute Iron & Steel Co., Newark; F. T. Bluhn, G. A. Fromm, of the American Radiator Co., New York City; W. R. Latham and C. L. Molton, of the Norton Co., New York City; W. A. Cavanagh and L. A. Boynton, of the United States Radiator Corporation, Dunkirk, N. Y.; Robert McGuire, of the United Brass Mfg. Co., Cleveland; Thos. Lee, of the Orange Supply Co., Orange, N. J.; Bishop Baird, of the Joseph Dixon Crucible Co., Jersey City; D. W. Jones, of Crane Co., New York City; H. E. Sippell, of the H. Mueller Mfg. Co., New York City; J. D. McInerney, of the Simmons Pipe Bending Works, Newark; Samuel M. Eisner, of the Eisner Bros. Co., Newark; Oswald R. Routh, of the Metals Supply Co., Newark; Wm. A. Fleig, of the Gamon Meter Co., Newark.

The return trip started at 6 p. m., and it was enlivened by music, refreshments and cigars, and so carefully had every part of the program for the day's outing been planned that not one in the entire party had experienced one dull moment during the entire day. The landing was made at Newark, N. J., at 8:30, and the whole party voted the day a grand success from start to finish.

BOSTON MASTER PLUMBERS' ANNUAL OUTING.

A party of several hundred, including members of the Boston Association of Master Plumbers and their families, made Bass Point, Nahant, their rendezvous on Wednesday, August 10, on the occasion of the annual outing of the Boston Association. While many of the men were unable to reach the resort until after noon the majority of the women and children went from Boston on the early boats and made a day of it. But even those who were late crowded enough fun into the afternoon and evening to make it one of the most enjoyable outings that the association has ever conducted. To give in detail all of the features of the unusually attractive program arranged by the committee, of which John J. Vogel was chairman, would be impossible. One of the features which furnished a whole lot of fun and a great many lame muscles, was the ball game between the dealers and the plumbers. The dealers won the game by a score of 9 to 6, but the plumbers had just as much fun. The lineup of the teams was as follows:

Dealers—Hoey, p.; McAuliffe, 1b. and captain; Finnerty, 2b.; Verry, s. s.; Maher, 3b.; Leary, cf.; Burke, r. f.; Philbin, l. f. (This team didn't need a catcher.)

Plumbers—Crozer, c.; Drury, p. and captain; Lang, 3b.; Sullivan, s. s.; Ahern, l. f.; Brown, 2b.; Gillispie, 1b.; Kelley, c. f.; Cassidy, r. f.

The prize was a box of cigars.

Another big feature of the day's program was the dinner which, it is not necessary to remark, was given strict attention. The committee in charge, in addition to Chairman Vogel, consisted of P. J. Lynch, of Boston; James Cassidy, of Cambridge, and Andrew F. Curtin, of Medford.

ATLANTIC CITY MASTER PLUMBERS TO HOLD ANNUAL OUTING.

The Master Plumbers' Association of Atlantic City, N. J., will hold its annual outing on Friday, August 26, 1910, at the Fishermans Hotel, South Atlantic. In the official invitation to the event we find this postcript: "Have your tank lined with 14-oz. copper and plumbers' salesmen should leave their price-book on enamelware at home."

CONTRACTS AWARDED.

The Fort Dodge Heating & Plumbing Co., Fort Dodge, Iowa, has been awarded the contract for the plumbing and heating of a large hotel at Dallas, Tex.

The F. S. Spencer Warming & Ventilating Co., Minneapolis, Minn., has been awarded the contract for the installation of a new heating and ventilating system in the new Roosevelt school which is now in course of construction at Grand Forks, N. D.

Gearen & Ziegler, Sioux City, Iowa, have secured the contract for the plumbing and heating of the new Western Iowa building which is to be erected at the corner of Fourth and Court streets in that city. The contract amounts to $4,500.

The E. O. Nay Co., Pasadena, Cal., has been awarded the contract for the installation of an up-to-date plumbing system in a large new building at the corner of Delacy and Colorado streets in that city.

Norris & Sorton, Streator, Ill., have secured the contract for the plumbing and heating of the city hall in that city. The contract amounts to $685.

The Thoeming Mercantile Co., New Castle, Wyo., has been awarded the contract for the heating and plumbing of the new Nicholls building in that town.

The Ruhaak & Lackman Co., Peoria, Ill., has secured the contract for the plumbing and heating of the new Franklin school. The plumbing amounts to $1,161.30 and the heating to $1,543.

THE METAL MARKET

PIG IRON DULL.

The mid-summer dullness in the pig iron market continues and there is less business on all hands. Even with this, the situation is not especially discouraging. Prices are down to a low level and it is known that four large buyers in the Birmingham district who this week were looking for a round tonnage of iron at $11 failed to place a single order. Such concerns as the Alabama Consolidated have no iron under $12 and another concern is practically out of the market. In New York a few orders have been taken involving 500 tons of foundry iron and there is several inquiries pending for 1,000 ton lots. The pipe-founders are the largest buyers of iron, but some low figures have been named on pipe during the last month. Practically no business has developed for the next year, and there is very little inquiry for the fourth quarter of this year. This is a common occurrence when prices are falling, but should there be only a little upturn, say 50 cents a ton, melters of iron would hasten to cover. The report of the U. S. Steel Corporation showing orders on hand amounting to slightly less than 4,000,00 tons was favorably interpreted because sentiment is improving. The figures, however, mean very little either one way or the other. Prices are as follows:

No. 2 Southern foundry, Birmingham	$11.25 to	$11.75
No. 1 Virginia foundry, New York	16.00 to	16.25
No. 2X Northern foundry ,New York	15.75 to	16.00
No. 2 Plain Northern foundry, New York	15.25 to	15.50
No. 2 Northern foundry, Chicago	16.50 to	17.00

MORE BUYING OF COPPER.

Consumers in many parts of the country have bought copper freely during the last week. Prices have not advanced much, but there is decidedly firmer tendency and abroad the feeling is much better. It is significant to note that the price of copper in London, the great speculative copper market, has advanced practically one cent per lb., in American money, from the low figure of last month. It is felt that the mines are now making headway against the accumulated surplus of copper with a diminution in American supplies amounting to not more than 10 per cent at the outside, and possibly not greater than 5 per cent equilibrium will soon be restored. Then further headway would be made in reducing the large stock of copper. Electrolytic is now selling at 12.62 1-2 cents and Lake at 13 cents.

LEAD

The market is exceptionally strong, outside interests being from 5 to 10 points above the leading seller in New York and on a par with it at St. Louis. In New England prices are several points higher than they are in New York. In view of this fact it is believed that the American Smelting & Refining Co., will shortly advance its quotation from the present rate to 4.40 cents.

PIG TIN.

The market is exceptionally firm, sales have been made at 33.40 cents this week. Stocks are small and the tin coming into this country is not large. As for example, about the first of the month stocks were approximately 700 tons and there have arrived so far 2,050 tons, while it is expected that 1,325 tons will come in during the remainder of the month. This would give only 4,075 tons available for consumption during August, and considering that the deliveries were 5,000 tons in June and 3,800 in July, this will not be at all too large. This is especially true when it is remembered that consumers have bought sparingly in recent weeks owing to the high price and the corner. In all events, the tin market will be an interesting one for the next several weeks.

OLD IRON.

The market is dull and featureless. Quotations are more or less nominal as follows:

No. 1 yard wrought long	$11.50 to	$12.00
No. 1 yard wrought short	11.00 to	11.50
Machinery cast	11.00 to	11.50
Wrought turnings	7.50 to	8.00
Cast borings	7.00 to	7.50
Stove plate	9.00 to	9.50

MILWAUKEE AND WISCONSIN NEWS.

Despite the fact that the Milwaukee common council passed the ordinance more than three months ago directing the establishment of public-comfort stations in the city and although the aldermen have not discussed the matter for many weeks, Mayor Emil Seidel, the Social Democratic executive, has announced that he is determined that action shall be taken in the matter. Mayor Seidel favors the type of station which can be erected at a cost of less than $4,000 each, and there are resolutions in the common council providing for the erection of such stations, but they have not been reported by the committee to which the council referred them. Dr. W. C. Rucker, Milwaukee's new and enterprising health commissioner, also favors the idea of comfort stations and with the backing of such men as Mayor Seidel and Dr. Rucker, it is certain that the stations will be erected. Mayor Seidel has announced that he will confer with men especially interested in the matter with a view of having early action taken.

A. K. Kassmann, plumbing inspector of Kansas City, was a recent guest of George R. Stolz, Milwaukee plumbing inspector. Mr. Kassmann was there to obtain information regarding plumbing conditions in Milwaukee.

Grassler & Gezelschap, one of the most prominent plumbing and lighting fixture firms of Milwaukee, has purchased the John Koehler property at 214 Third St., for a consideration of $52,000. The building, which is two stories high, will be remodeled and after an addition has been erected, will be used as a branch establishment by Grassler & Gezelschap. The property has a frontage of 25 feet on Third street and is 150 feet deep. "It is true that we have purchased the Koehler property," said Edmund Grassler of Grassler & Gezelschap. "It was secured for the purpose of allowing a general expansion of our business. Just as soon as the structure has been remodeled and enlarged it will be used for manufacturing and show-room purposes."

Proposals will be received until Aug. 22 by H. E. Briggs, commissioner of public works, Milwaukee, for furnishing and installing complete systems of steam-heating apparatus in fire engine houses, No. 4, 5 and 6. The work is to be done within 60 days from the date of awarding the contract.

G. H. Flatman, Waunakee, Wis., is making arrangements to open a plumbing and heating establishment at Broadhead, Wis.

The town of Hudson, Mass., has appropriated $1,800 for installing new sanitary arrangements at the Harriman grammar school. The work will include the installation of 12 closets, a slate urinal and other fixtures.

C. W. Perkins, who for the past 12 years has been connected with a Lewistown, Me., plumbing and metal working establishment, has opened a shop for himself at 47 High Street, Auburn, Me.

NEW ENGLAND NEWS.

Building has been brisk in Beverly, Mass., for the seven months of 1910, according to the figures of Inspector of Plumbing F. W. Herrick. Over 100 new tenements have been completed for occupancy, all of which have been fitted with the most improved plumbing arrangements. In addition a large amount of repair work has been done.

The town of Brookline, Mass., has asked for bids for heating and ventilating an eight-room primary schoolhouse to be erected on Westbourne avenue. Bids will be received at the office of the school committee in the town hall until 8 o'clock on the evening of September 12th.

W. J. Coughlin, Middletown, Conn., has the plumbing contract for the Edwards block in Portland, the plumbing and heating contract for the John E. Dillon home in Newfield and a similar contract for A. L. Canfield's new house at Rocky Hill, Conn.

Bids for additional sanitary arrangements in the Latin and English high schools at Somerville, Mass., have been received and the contract, which calls for the doubling of the present accommodations for both sexes and the installation of bubble drinking-fountains throughout the buildings, was awarded to C. W. Cahalan for $3,287. The list of bids received follows: E. S. Stack, $3,980; W. L. Hallett, $3,848; J. H. Adcock, $3,676; D. A. Carr, $3,470; F. O. Johnson, $3,468; J. J. Fisher, $3,464; Lewis & Doherty, $3,334; Armstrong Bros., $3,289; C. W. Cahalan, $3,287.

The city council of Franklin Falls, N. H., has voted an appropriation of $3,145 for installing a ventilating system in the Franklin high school building.

The G. S. Blodgett Co., Burlington, Vt., has been awarded the contract for installing an entire new heating system in the federal building at Rutland, Vt., and also to make extensive alterations in the plumbing in the same building. The Blodgett company has also been awarded the contract for heating and plumbing the new Hotel Vermont at Burlington. The company was the lowest of a number of bidders, including several New York concerns.

Orr & Wolf, Concord, N. H., have been awarded the contract for the installation of a hot-water system for the lavatories in the government building at Concord. Repairs on the heating plant will be made by M. E. Clifford.

Bids for installing eight new closets and a teachers' toilet room in the Heald school at Bar Harbor, Me., and the modernization of the present plumbing system, have been received by the school authorities and the contract will be awarded to Frank T. Young, who was the lowest bidder. The bids received were as follows: Frank T. Young, $1,087; Lester P. Carter, $1,130; Robert Stanley, $1,324; John W. Silk & Co., $1,335; William S. Pierce, $1,345.

The contract for the installation of a new steam-heating plant for St. Michael's parochial school at Montpelier, Vt., has been awarded to Peck Bros. of that city.

Bids for the renovation of the toilet facilities at the Ferry school in Ansonia, Conn., have recently been received and the contract has been placed with E. Ritchie, whose bid of $3,589 was the lowest received. The other bidders and their figures follow: Beardsley Building Co., $3,600; Max Durrschmidt, $3,875. A sub-contract for plumbing has been placed with D. H. Kelly.

James Dow, inspector of buildings of Lowell, Mass., is asking for bids for two new boilers, one for the Edson school and the other for the Central fire station.

Mayor John F. Fitzgerald, of Boston, has approved a contract with James P. Dwyer for setting up and piping boilers in the Atherton and Walnut St. schoolhouses. Bids on this work were as follows:

	Atherton.	Walnut.
James P. Dwyer	$2,193	$722
J. J. Hurley & Co.	2,364	763
Huey Brothers Co.	2,327	777
Laskey & McMurrer	2,211	795
Smith-Alden Co.	2,496	753
F. W. Zeimer & Co.	2,397	764

The mayor has also approved a contract with J. J. Hurley & Co., for setting up and piping boilers in the Francis Parkman schoolhouse. The bids for this work were as follows: J. J. Hurley & Co., $1,265; James P. Dwyer, $1,358; Huey Brothers Co., $1,387; Laskey & McMurrer, $1,357; Smith-Alden Co., $1,435; F. W. Zemier & Co., $1,342.

The G. S. Blodgett Co., Burlington, Vt., has been given the contract for installing a new heating system and modifying the plumbing in the United States courthouse and postoffice building at Rutland, Vt.

The Taylor-Flagg Co., Meriden, Conn., has been awarded the contract for installing the entire plumbing equipment at the Meriden hospital and the Bradley Nurses' home connected with the institution.

Willard B. Wilson, North Brookfield, Mass., has been awarded the contract for plumbing the Grove-street and high school buildings, much to the displeasure of other plumbers and contractors in North Brookfield, some of whom claim that partiality has been shown and that they were not even invited to bid on the work.

Henry E. Jenkins, Hyde Park, Mass., has the contract for the plumbing in the new addition to the Hemenway school in Readville, Mass.

The Hub Plumbing & Heating Co., Newburyport, Mass., is installing a shower-bath and the necessary fixtures at the Hancock-street playground. A similar contract has just been completed by the same firm at the Kent-street playground.

At a special town meeting held recently the town of Huntington, Mass., appropriated $1,600 for installing a new heating system in the Murrayfield school building. The matter was placed in the hands of the school board and selectmen acting jointly.

C. A. Ludden, Chicopee, Mass., has been awarded the contract for plumbing the new school at Chicopee Falls by the general contractors.

The journeymen plumbers of Meriden, Conn., have won their demand for Saturday half holidays the year round.

The contract for heating the new schoolhouse which the town of Newburyport, Mass., is erecting has been awarded to the Ordway Heating Co., Newburyport, after considerable discussion. The bids were as follows: Walker & Pratt Co., $3,267.50; F. E. Woodward, $3,175; Stone & Underwood, $3,120; Ordway Heating Co., $2,850; Hub Heating Co., $2,272.80.

SPRINGFIELD PLUMBERS WANT PUBLIC HEARING.

The water board of Springfield, Mass., stirred up a hornet's nest when they gave out the finding of George C. Whipple, who was employed as an expert to determine the cause of the pipe-rust which has been causing considerable trouble recently. Mr. Whipple blamed "cheap plumbing." This the master plumbers of the city resent and they have demanded that a public hearing be granted so that they may show that the fault is not theirs. They claim that the fault lies with the water and the sediment in the mains. They claim that they have evidence which will refute the testimony of the water department's investigators. The request for a public hearing made to the city authorities reads as follows:

"We, the master plumbers of Springfield, believing that we have been unjustly quoted by the Springfield water board in a report printed in the Springfield papers and in order that the general public may know the truth, demand a public hearing when our side of the case may be presented.

"We believe the water board is attempting to dodge the truth by placing the blame on the plumbers and builders; therefore, we propose to give the public a chance to know the truth and will also invite the members of the water board to be present at said hearing; said hearing to be held in the municipal building at an appointed time in the near future, when notice will be given to the public.

"James E. Walls, Jr., Secretary,
"Master Plumbers' Association."

The controversy has caused columns of comment in the Springfield newspapers. C. I. Gagnier, of the plumbing firm of Gagnier & Angers, taking the side of the plumber in several communications, while Edwin W. Mooring, of Waterbury, Conn., in a letter addressed to the editor of "Springfield Republican," takes the other side. Mr. Mooring says: "The faulty galvanizing is at the bottom of the trouble. Where formerly there was no difficulty in getting fairly good galvanized piping, today it is out of the question."

PACIFIC COAST LETTER

The general tie-up of building operations which threatened San Francisco for a time has been averted through a settlement of the labor difficulties in a branch of the building trade and late last week work was resumed in all lines. Although the plumbing trade was not directly involved in the controversy, it was seriously affected and several hundred men were thrown out of employment temporarily. The situation was commencing to grow serious and had the trouble continued for two weeks longer there would have been almost a complete tie-up, as far as plumbers were concerned. As it was, operations during July were sadly interfered with and the building record is far from being a satisfactory one. Permits were issued for buildings with an estimated valuation of $1,452,741, this record being one of the smallest since the fire, and as low as some of the other Coast cities. During two weeks of that month there were scarcely any permits taken out and but few contracts let, the big decrease being due in a large measure to the strike. Architects are busy however, and work on a number of fair-sized structures will be commenced shortly.

The steel structure of the new Examiner building at Third and Market streets, San Francisco, Cal., is now almost one-half completed and the general contractors are arranging to let the plumbing, heating and ventilating contracts at an early date so that work on the roughing in can be commenced. These contracts will be quite large as provisions must be made for additions at a later date, it being the plan to add a number of additional stories when the demand warrants the move.

Work is being rushed on the new Hall of Justice and the rough plumbing work has been about completed. Contractors on this building are being advised to rush their work as much as possible as the structure is badly needed Work will soon be commenced on the plumbing and heating of the new County Jail and an appropriation of $100,000 has been made to cover this. Several school buildings are now in course of construction and work on others will be commenced shortly so that public work is forming an important part of building operations at the present time in San Francisco.

The John G. Sutton Co., 229 Minna St., San Francisco, will be able to occupy its new warehouse and office building at Folsom and Elizabeth streets some time next winter. An attractive building has been planned by a prominent local architect and contracts will soon be let for the erection of this structure. This firm is an important factor in the local plumbing, heating and electrical contracting business and does large amounts of work outside the city, especially for the government.

From Stockton, Cal., reports are coming to the effect that serious labor difficulties are now being experienced there and that employers in the various branches of the building trade have united in their efforts to administer a rebuke to the labor unions and to operate under the open-shop plan. According to these plans the master plumbers were to have started the movement late last week by declaring a lock-out against their union help but no news has yet been received to the effect that this action was taken.

E. J. Lord and J. Belser of the firm of Matson, Lord & Belser, San Francisco, which is to construct a new water distributing system for the City of Manila, sailed for the Island recently to arrange for the preliminary work.

M. Levy, San Francisco, has secured the contract for installing the plumbing in a four-story class B building being erected by G. Orsi on Montgomery avenue, near Washington.

The success of the Oakland salt-water fire-protection system has led to the planning of a similar system for Fitchburg, it being contended that the new system can be installed for one-half the cost of furnishing fire-fighting facilities with fresh water. Plans are being made to erect a pumping station on Lake Merritt and lay a long line of cast-iron pipe. Alameda is figuring on a similar system, as are several of the cities around the Bay.

Crane Co. suffered a loss of about $1,000 at Oakland recently when a tank of asphaltum boiled over and caught fire. The fire caught in the dipping tank where pipes and plumbing supplies are given an asphalt treatment.

The E. C. Nay Co., Pasadena, Cal., has been awarded the contract for installing the plumbing and heating systems in a fine residence being erected at South Pasadena by C. E. Grosse. The contract totals $4,907 and includes the installation of a vacuum-cleaning system.

City Plumbing Inspector A. C. Shaver, of Pasadena, Cal. has just been compelled to condemn a decidedly interesting piece of work in the shape of a toilet bowl made by a local cement worker. In design and execution the work was without a flaw but as cement is more or less of an absorbent the article could not be accepted.

The Realty Syndicate is preparing to add eight stories to its building on Broadway, near Fourteenth street, Oakland, and have plans made for a public-comfort station for both sexes, the one for ladies to be located on a lower floor with an attendant on hand at all times.

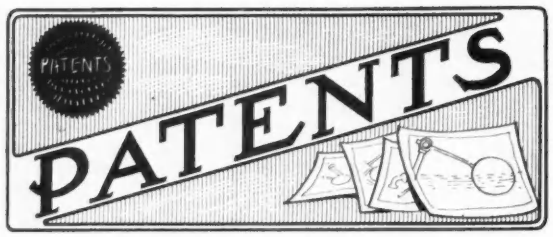
T. J. Stacey, Eugene, Ore., has sold his plumbing and heating business to W. H. Kreaty in that city.

The Thomas Haverty Co., Los Angeles, Cal., has been awarded the contract for the heating and ventilating of the new 11-story building being erected at Sixth and Spring streets in that city for the Los Angeles Trust & Savings Bank.

NEW BOOK ON EXHAUST STEAM HEATING.

The "Exhaust Steam Heating Encyclopedia" is the subtitle of a profusely illustrated, 120-page, 6x9 in. book published by the Harrison Safety Boiler Works, 3153 N. 17th St., Philadelphia, Pa., which describes and illustrates practically all the many exhaust-steam heating systems now on the market, including the various vacuum systems, as well as the ordinary gravity-return and back-pressure systems. The diagrams, in three colors, show the essential features of each system, and render possible a most interesting comparison of the ideas of the several inventors and manufacturers. One point clearly brought out is the adaptability of the new Cochrane steam-stack and cut-out valve heater and receiver wherever exhaust steam is to be used for heating or drying purposes. The heater performs the functions of the return tank usually installed, and also of the independent oil-separator required to prevent cylinder-oil and grease from fouling the heating system, and to prevent the contamination of the condensed returns with oil, so that they may be utilized from boiler-feeding. Further, as its name implies, the heater takes the place of the ordinary feed-water heater, serving to heat the mixture of returns and cold make-up water to boiling temperature before they are pumped into the boiler. The amount of make-up water is automatically regulated to meet the demands of the boiler-feed pump. In an improved type of this apparatus, here described, cut-out valves serve to isolate the body of the heater for cleaning or inspection while the heating system continues to receive purified steam through the separator. These two valves are operated from a single lever; in the larger sizes, the lever-control is so arranged that the small valve between the trap and the heater overflow opens before and closes after the large valve between the separator and the body of the heater, thereby acting as a pilot, and relieving unbalanced steam-pressure on the latter. Another chapter is devoted to an interesting discussion of the exhaust-steam heating problem in connection with condensing plants and low-pressure turbines, while over thirty pages are occupied by tables and engineering data, which should prove of value to all who design, install or operate exhaust-steam heating systems. The book, which is handsomely printed and bound, will be supplied to anyone interested in these matters, upon application, mentioning "Domestic Engineering."

A danger known is a guide-post to safety. "Domestic Engineering" publishes a weekly list of dangers that menace the industry. Ultimate safety is thereby assured.



965,861. Trap for Sewer Vent-Pipes. Louis Berwanger, St. Louis, Mo. A trap for sewer vent-pipes, comprising a pair of shells, which taper toward their lower ends, one shell being arranged immediately below the other, there being a space between said shells, a flange on the upper end of the upper shell, hangers depending from the lower end of the lower shell, a cup carried by the lower ends of the hangers, which cup is larger in diameter than is the lower end of said lower shell, and a series of springs carried by the upper shell for maintaining the trap in a central position in a sewer vent-pipe.

965,890. Pipe-Wrench. Percy T. Greenwood, Bridgeport, Conn., assignor to John J. Beirne, Bridgeport, Conn.

965,946. Flush-Valve. Joseph Rothchild, Bayonne, N. J., assignor to John Simmons Co., New York, N. Y., a corporation of New York. A flush valve comprising an outer casing impervious to water and provided with an inlet conduit, an inner casing having inlet ports and gates adapted normally to close said ports consisting of a plurality of shells adapted loosely to embrace the inner casing, in combination with means for yieldingly holding the same against it.

965,970. Tap-Wrench. Frank O. Wells, Greenfield, Mass., assignor to Wells Brothers Company, Greenfield, Mass., a corporation.

966,040. Valve. Eugene J. McCarty, Clinton, Mass.

966,061. Faucet. George J. Silver, Salt Lake City, Utah.

966,071. Water-Softening Apparatus. Kent W. Bartlett, Madison, Wis., assignor to Northern Water Softener Company, a corporation of Maine.

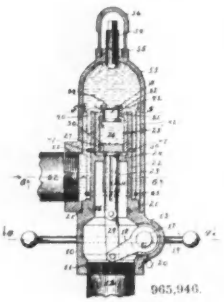
966,131. Automatic Pipe-Coupling. Isadore Seidel, Clayton, Wash.

966,147. Tank-Heater. Edgar B. Wills, Mendota, Ill.

966,150. Valve. Samuel H. Woodbridge, Newton, Mass.

966,180. Sanitary Filtering-Faucet. George W. Durbrow, Indio, Cal. In a faucet filter provided with an intake and a discharge, a series of communicating sections between said intake and discharge progressively increasing in cross-sectional area from said intake to said discharge, an upright filter proper in each of said sections, and upwardly and downwardly extending receptacles for impurities adjacent the upstream side of each filter proper.

966,181. Filtering Device. George W. Durbrow, Los Angeles, Cal. A filter comprising a hollow body provided with an inlet, a seat for a filter-shell, a receiving-chamber on one side of said seat, and a filter-shell-chamber on the other side of said seat; a tapered filter-shell in the filter-shell-chamber with its small end fitting said seat and with its large end closing the opposite end of the filter-shell-chamber, the central portion of the filter-shell-chamber being larger than the filter-shell, and there being perforations through the central portion of the filter-shell; a three-way valve having two inlets and an outlet, means forming a passage leading from the receiving chamber through one inlet to the valve, and means forming a passage leading from the filter-shell-chamber through the other inlet of the valve; so that by manipulating the valve one way unfiltered water may be secured; by manipulating the valve another way the filter-shell may be drained; and by manipulating the valve a third way both passages may be closed.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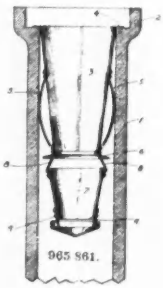
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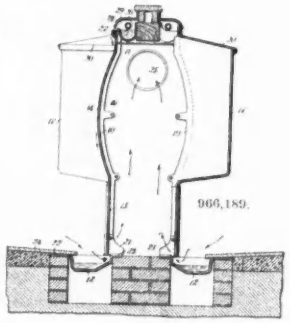
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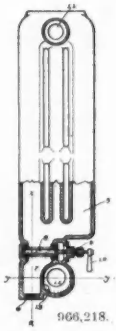
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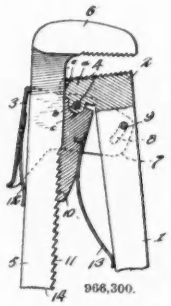
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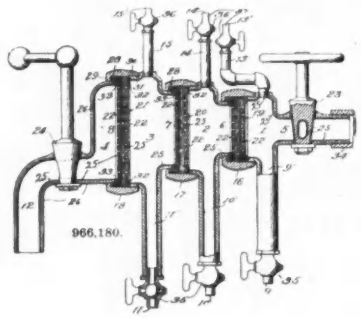
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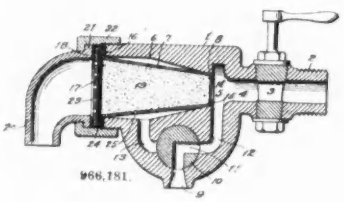
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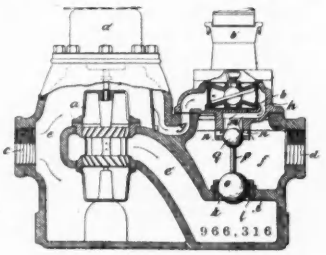
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966,189. Urinal. Nathaniel Frost, Bloomington, Ill., assignor to American Foundry & Furnace Co., Bloomington, Ill. A urinal having a plurality of back plates in horizontal alinement, each two adjacent plates being spaced apart along approximately their upper halves at their adjacent edges, and having their adjacent edges in engagement with each other along approximately their lower halves, rearwardly-extending flanges on said plates at said edges, and hollow substantially V-shaped partitions extending outwardly from said plates, the rear sides of said V-shaped partitions extending through the openings between the plates and secured to said flanges in the rear of said plates, and the angle of intersection of the sides of said partitions extending substantially vertically and in front of said plates.

966,218. Radiator. Roland W. Knapp, Minneapolis, Minn. Assignor of one-half to Holland J. Knapp, Minneapolis, Minn. A radiator section having a supply opening in its lower wall and a supply passage communicating therewith, said supply passage extending to the top of the section and said section having a port in its upper wall for connection with an adjoining section, said section also having a transverse return passage in its lower portion and a wall separating it from said supply passage, said

return passage being open at each end for communication with adjoining sections, whereby the heating fluid entering said supply passage will be compelled to flow therein to the top of said section and from thence to said adjoining sections before entering said return passage, substantially as described.

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